

HONDA

90 MODEL C200/CT200

Shop Manual



HONDA MOTOR CO., LTD.

FOREWORD

For proper maintenance of a vehicle, it is primarily necessary to obtain an exact knowledge of the construction of the vehicle. This manual has been compiled to serve the users and give them practical knowledge of the construction of the HONDA 90 model C-200 motorcycle engine. For those engaged in the sale of this motorcycle, this manual also can be utilized as a reference for technical information.

This manual is composed of three sections, and the third section includes subsections on Construction, Operating Principles, Disassembling, Assembling, etc.

Efforts have been taken to explain the construction plainly and concretely by using as many pictures and illustrations as possible rather than merely stating theories.

In this service manual, only the engine is covered. Please refer to the Service Manual for the HONDA 50 for explanations of the construction, operating principles and maintenance of the frame parts and electrical equipment.

Honda Motor Co., Ltd.

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1 DISTINCTIVE FEATURES

The HONDA 90 model C-200 motorcycle is designed as an economical vehicle with many practical features such as an ability to climb steep slopes with a heavy load, easy operation, long durability and quiet running.

To give these special advantages, the motorcycle embodies the following three design features.

1. A semi-spherical combustion chamber is adopted to improve the cooling efficiency of the cylinder head and produce more output with lower fuel consumption.
2. The proper speed can be selected easily at all times with the hand-operated wet multi-plate clutch and return type 4-speed transmission.
3. An oil gear pump driven by the cam shaft force lubricates not only the transmission, crankshaft and cylinder head but all gears which move at high speeds, giving added durability to the engine and also preventing noise. Lubrication oil is kept clean at all times by a screen filter and special centrifugal filter.

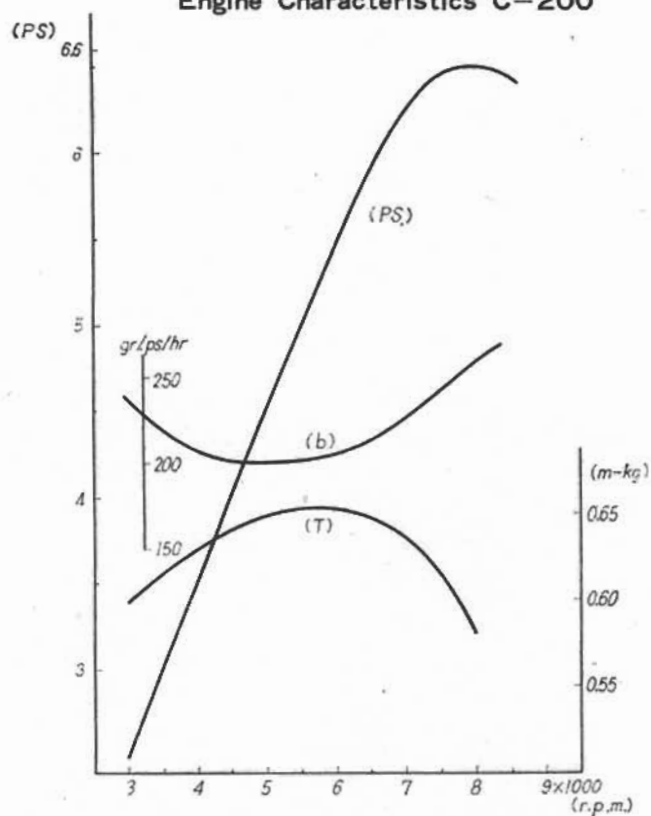
2 SPECIFICATION AND PERFORMANCE

Model C-200

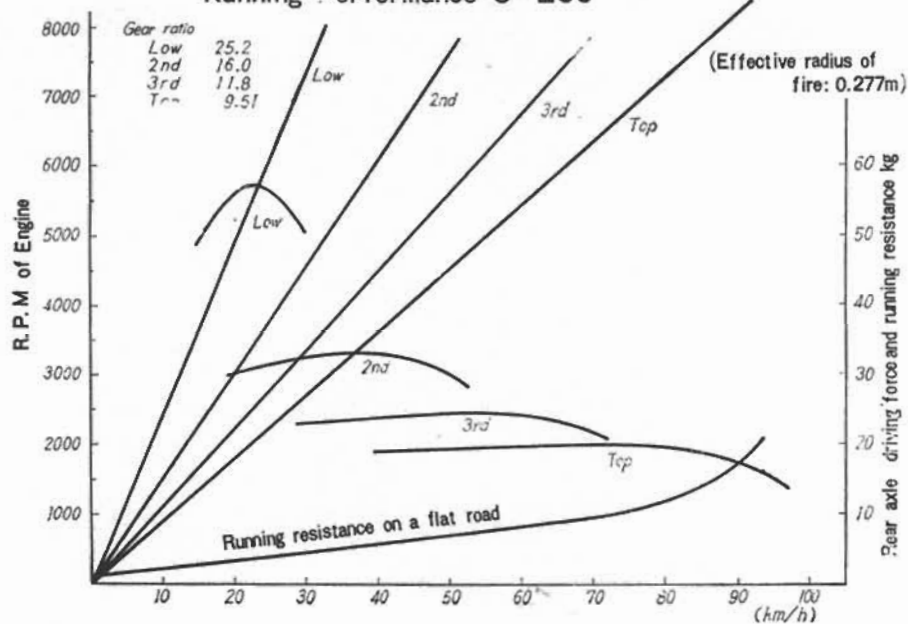
Dimensions mm		
Overall Length		1,805
Overall Width		625
Overall Height		955
Wheelbase		1,160
Ground Clearance		135
Weight (kg)		
Dry Weight		85.5
Weight Distribution	Front	38.0
	Rear	47.5
Performance		
Max. Speed km/h		90
Fuel Consumption (on flat road) km/l		80 at 35 km/h
Climbing Ability		18° (0.31θ)
Min. Turning Radius mm		1,660
Braking Distance m		6.5 at 35 km/h
Engine		
Kind of Fuel		Gasoline
Cooling System and Cycles		Air-cooled, 4-cycle
Number of Cylinders and Mounting Angle		Single cylinder, 10° (upward from level)
Location of Valves		Overhead valves
Combustion Chamber		Semi-spherical
Cylinder Capacity cc		86.7
Bore x Stroke mm		49 × 46
Compression Ratio		8
Compression Pressure kg/cm ²		10
Min. Fuel Consumption at Full-Load gr/ps-h		200/5,500 rpm
Weight with all equipment kg		22 including transmission
Dimensions (L x W x H) mm		446 x 289 x 364
Location and Mounting		Below center of frame, bolted
Starting		Kick

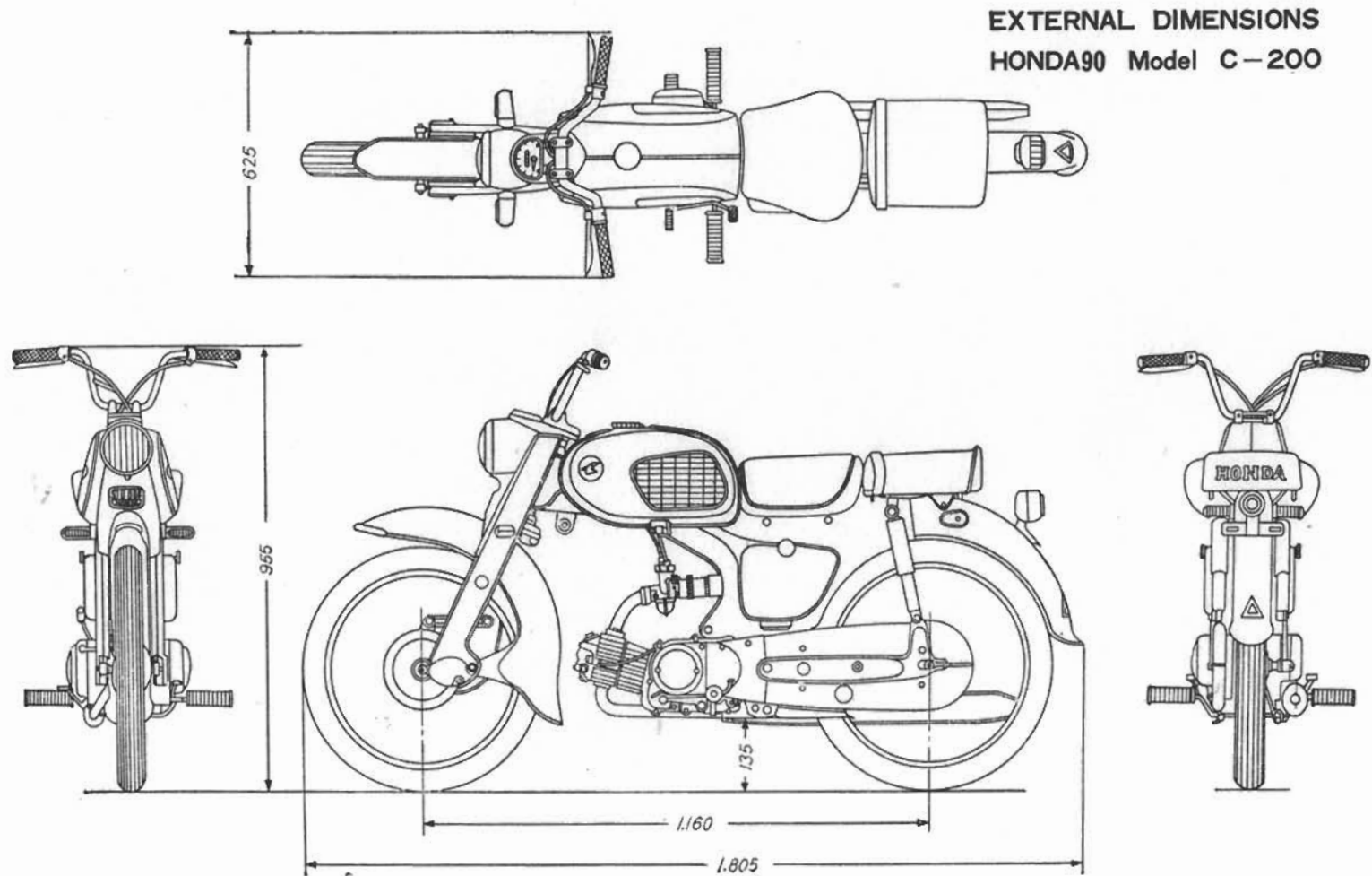
Ignition	High tension, electric spark
Spark Plug	D6H X20F
Fuel Tank Capacity <i>l</i>	8.5
Lubrication	Pump
Oil Pump	Gear
Oil Capacity <i>l</i>	0.9
Transmission	
Gear Ratio	3.72 between engine and transmission main shaft
Clutch	wet multi-plate
Gear Box	Constant mesh
Operation	Left foot
Gear Ratios	First 2.54
	Second 1.61
	Third 1.19
	Fourth 0.96
Drive Sprocket Ratio	2.67 (chain driven)
Steering	
Steering Angle	43° left and right
Length of Handlebar mm	625
Caster	63.5°
Trail mm	75
Wheels and Brakes	
Tire Size, Front and Rear	2.50-17 4 PR
Brake Type, Front and Rear	Internal expanding
Operation	Front Right hand
	Rear Right foot
Suspension	
Type, Front and Rear	Pivot
Damper, Front and Rear	Oil hydraulic
Frame	
	Backbone
Lights	
Head	6V-25/25 W
Tail	6V-2W
Stop	6V-6W (red)
Turn Indicators	6V-16W (orange)

Engine Characteristics C-200

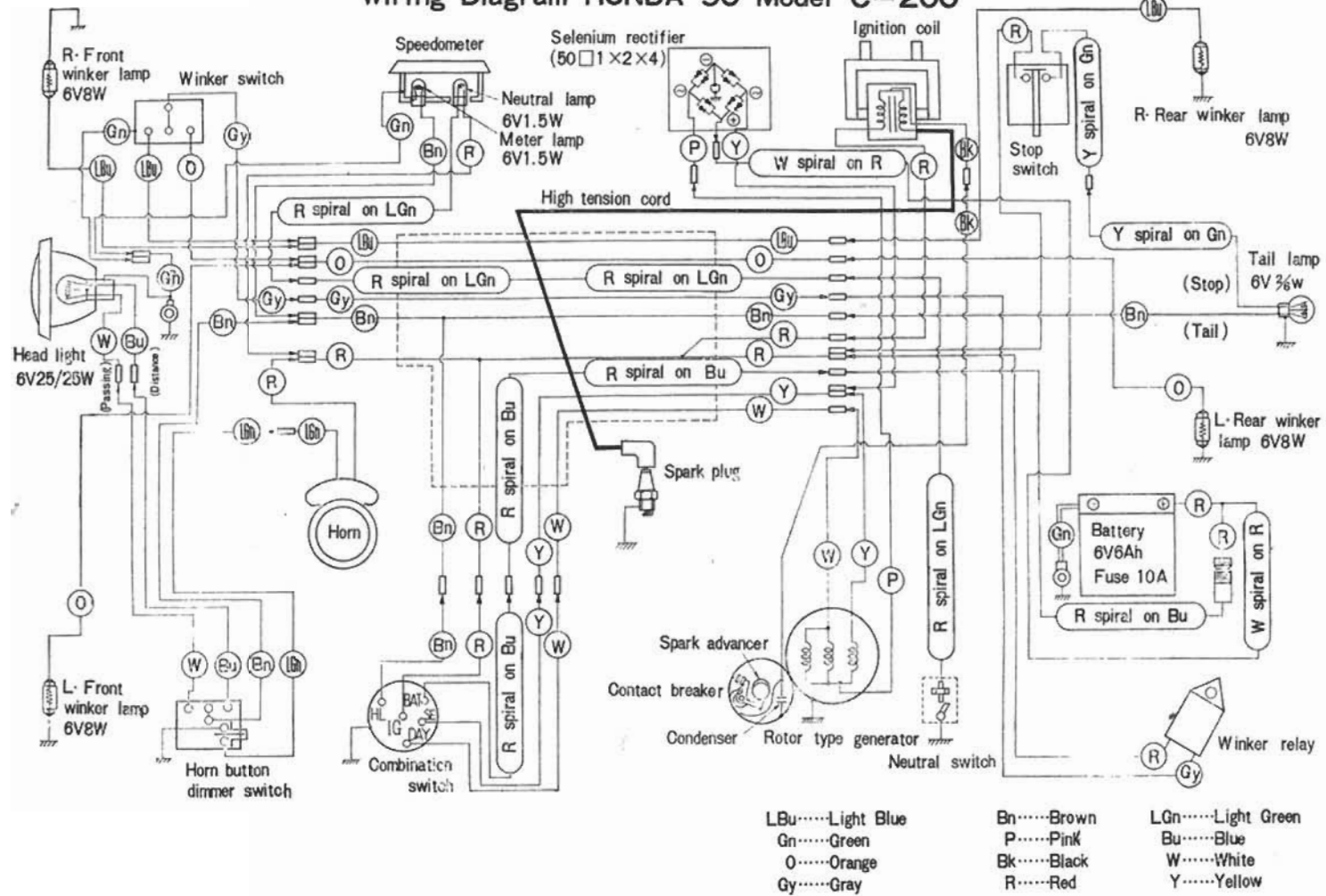


Running Performance C-200





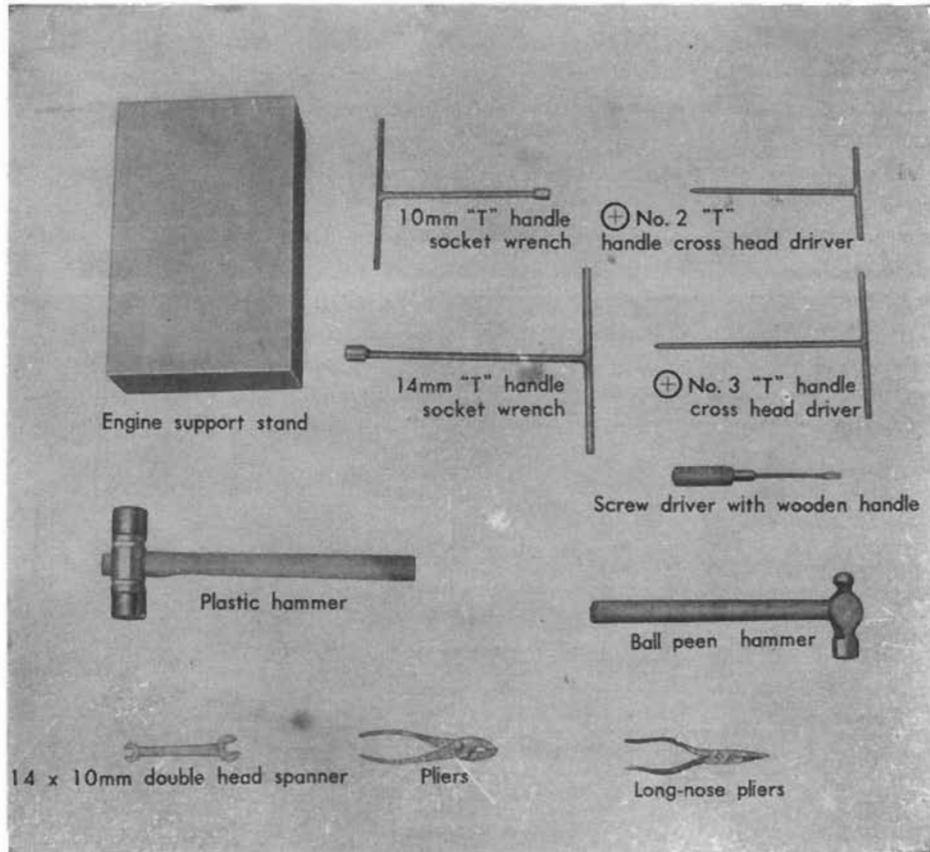
Wiring Diagram HONDA 90 Model C-200



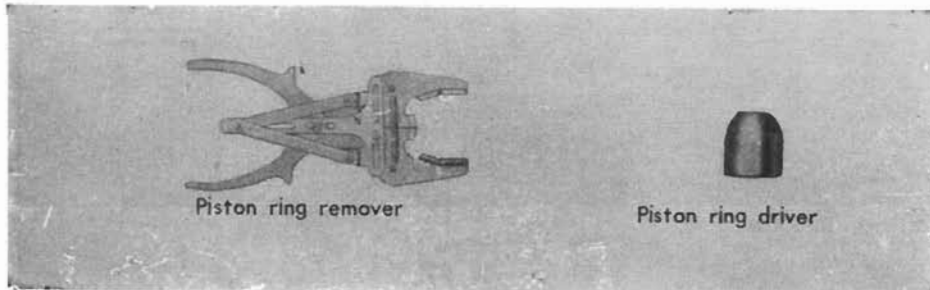
3 ENGINE

Tools Necessary for Disassembling and assembling the Engine

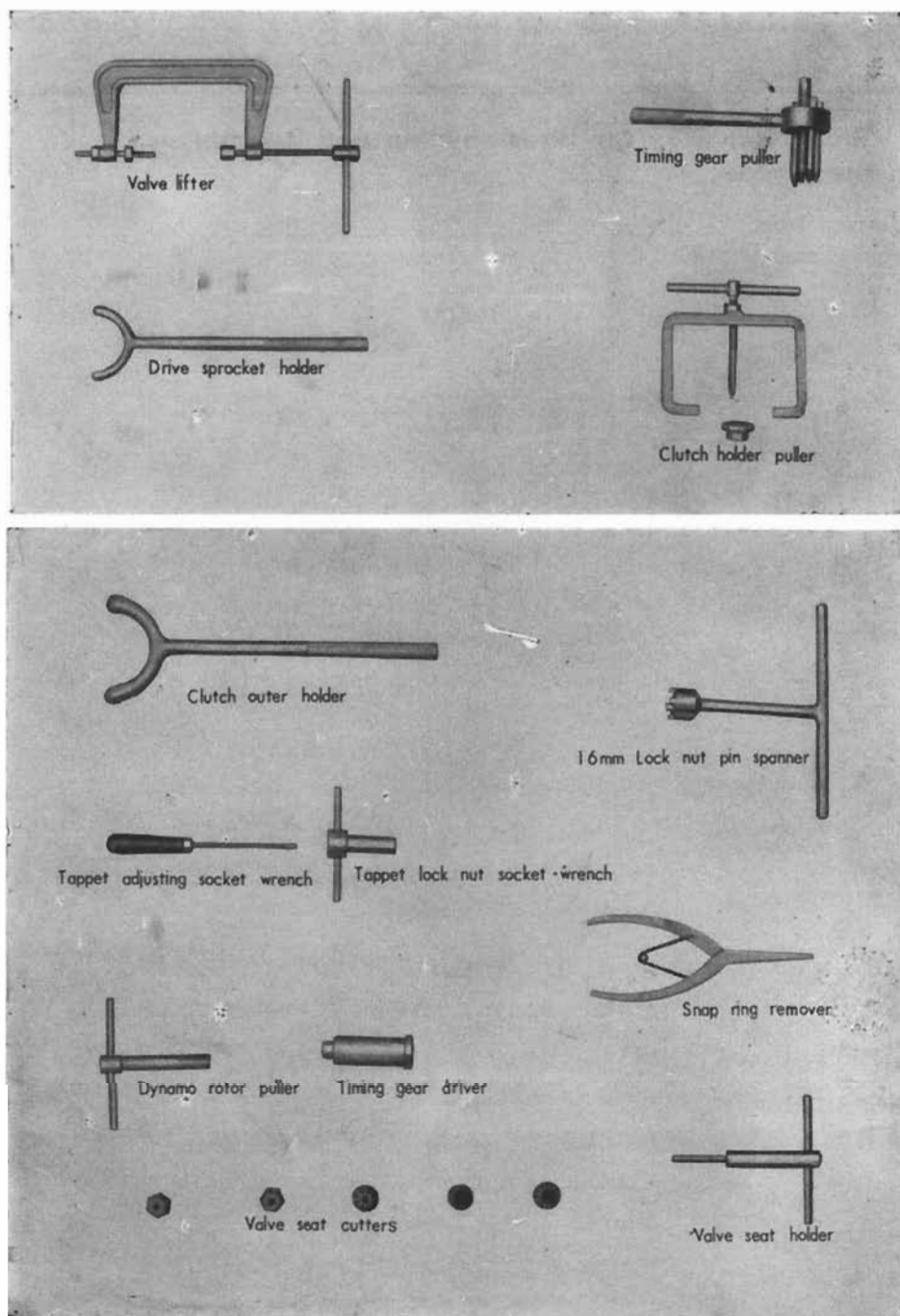
Common Tools



Special Tools



Special Tools (for Engine)



3-1 ENGINE

A. Construction

The engine determines the value and performance of a motorcycle. A good engine must be compact, light in weight and powerful. Its maintenance and service must be easy and in addition its mechanical appearance must be in harmony with the frame.

The design of the Honda 90 engine is the culmination of long years of research and development to make it fulfill these requirements. Special consideration was taken in designing the cylinder and cylinder head to improve cooling, combustion and engine efficiency so that a very large horsepower is obtained for the size of the combustion chamber because of this attention to heat control. Materials are meticulously selected and high precision machining is applied under strict quality control to minimize friction loss from moving parts. A quiet running engine also results from this design and manufacturing care. The beauty of the material of the light weight diecast aluminum alloy crankcase and covers adds to the style of the engine.

The Honda 90 is a 4-cycle engine with overhead valves. It has an alternating current dynamo on the left side of the engine and the primary drive on the right. The crankcase encloses the crank chamber in the front and transmission in the rear. The engine is lubricated by a gear oil pump driven by the cam shaft. Special attention is paid to the force-fed lubrication of gears which move at high speeds to add to their durability and prevent noisy operation.

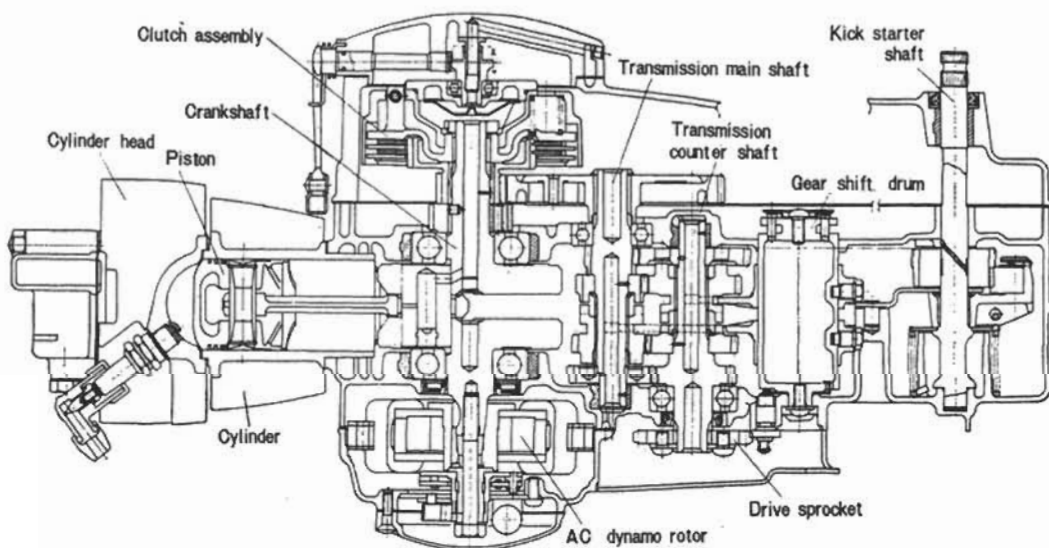


Fig. 1

B. Removing Engine

1. Remove battery box, disconnect leads from the wire harness and take out battery. (Fig. 3-4)
2. Pull high tension cord terminal from spark plug, remove terminal from high tension cord and take cord out of holding clip.
3. Remove crankcase cover and break chain at master link. Drive sprocket cover can be removed at the same time.

CAUTION

It is advisable to connect the ends of the chain with a piece of wire to keep the chain from being wound up inside the chain case.

4. Loosen clutch wire and remove it from clutch lever.
5. Remove inlet pipe from cylinder head.

CAUTION

When removing from engine, be careful not to damage the inlet pipe O-ring.

6. Detach exhaust pipe from cylinder head
7. Remove brake pedal spring from engine rear mounting bolt, take off 8 mm nut and pull out rear mounting bolt and engine rear support bolt. The engine can be removed from frame.

C. Installing Engine

The engine can be mounted by reversing the steps for Removing Engine.

CAUTION

When joining the ends of the drive chain, be sure the master link open end is in a trailing position, i. e., toward the rear when the chain is moving.

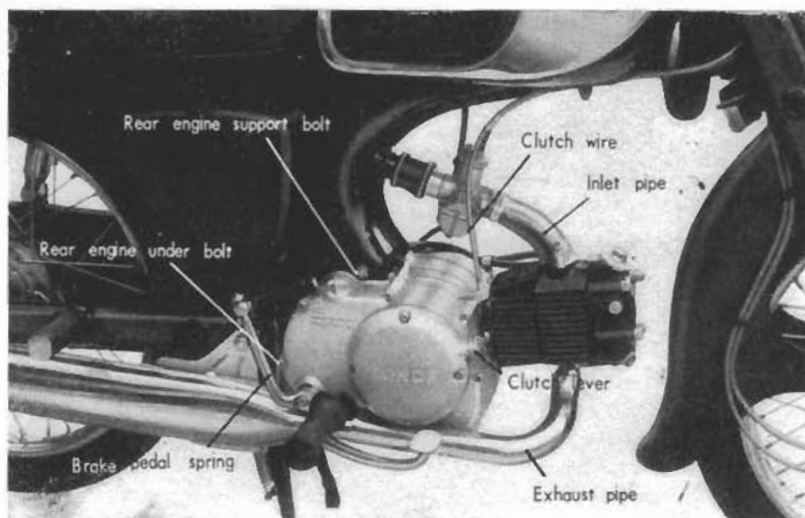


Fig. 3.2

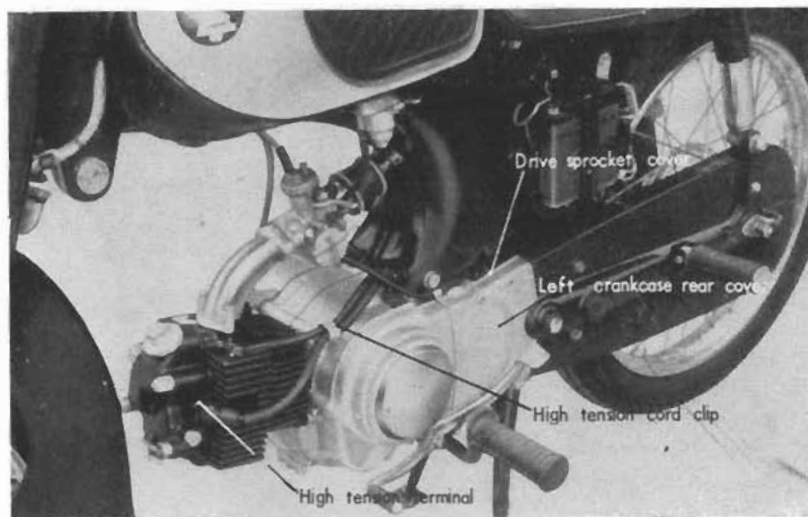


Fig. 3.3



Fig. 3.4 Disconnecting leads

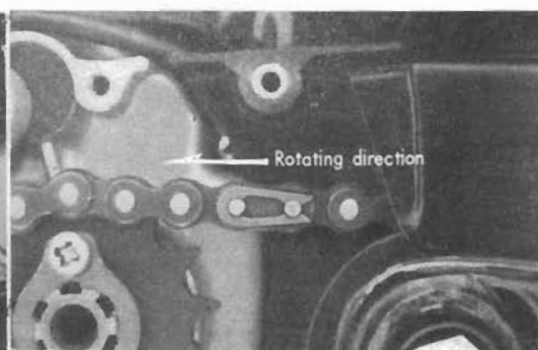


Fig. 3.5 Jointing drive chain

3-2 CYLINDER HEAD COVER AND CYLINDER HEAD

A. Construction

The cast iron cylinder head cover has rocker arms installed which transmit the motion from the push rods to the valves.

Lubricating oil passing through the cylinder and cylinder head jets from a nozzle in the cylinder head cover, lubricates rocker arms and valves and returns to the crankcase through an oil passage from the cylinder head.

The cylinder head has a dome-shaped combustion chamber which is excellent for providing good combustion. The valves are fitted directly through the cylinder head and there are no valve guides. The displacement of the combustion chamber is 16.7 ± 0.2 cc when the valves are closed and a spark plug fitted. Along with the cylinder, the cylinder head and cylinder head cover are mounted on the crankcase at a 10° upward angle.

B. Disassembling

1. Remove 8 mm nut and cap nut and take off cylinder head cover.
2. Pull out inlet and exhaust push rods.
3. Remove cylinder head.

CAUTION

When removing head, be careful not to damage cylinder gasket and O-ring.

C. Assembling

1. Place cylinder gasket and O-ring in position on cylinder and mount cylinder head, taking care not to damage gasket.
2. Insert inlet and exhaust push rods. Be sure they are in the right position: the inlet push rod is longer than the exhaust push rod.
3. Mount cylinder head cover, making sure there are no leaks, and tighten the nuts in the sequence shown in Fig. 3-10.

CAUTION

Be sure the steel balls at the end of the push rods fit the rocker arms properly before tightening the nuts.

4. Adjust tappet clearance (Refer to 3-9 A).

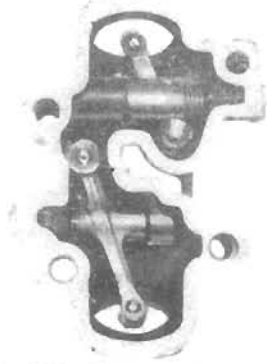


Fig. 3.7 Built-in rocker-arms

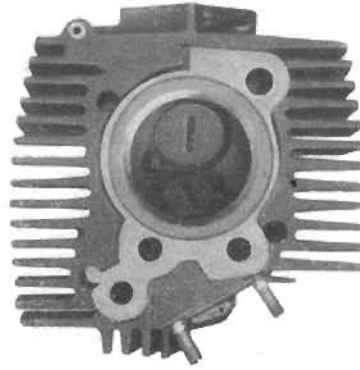


Fig. 3.8 Combustion chamber

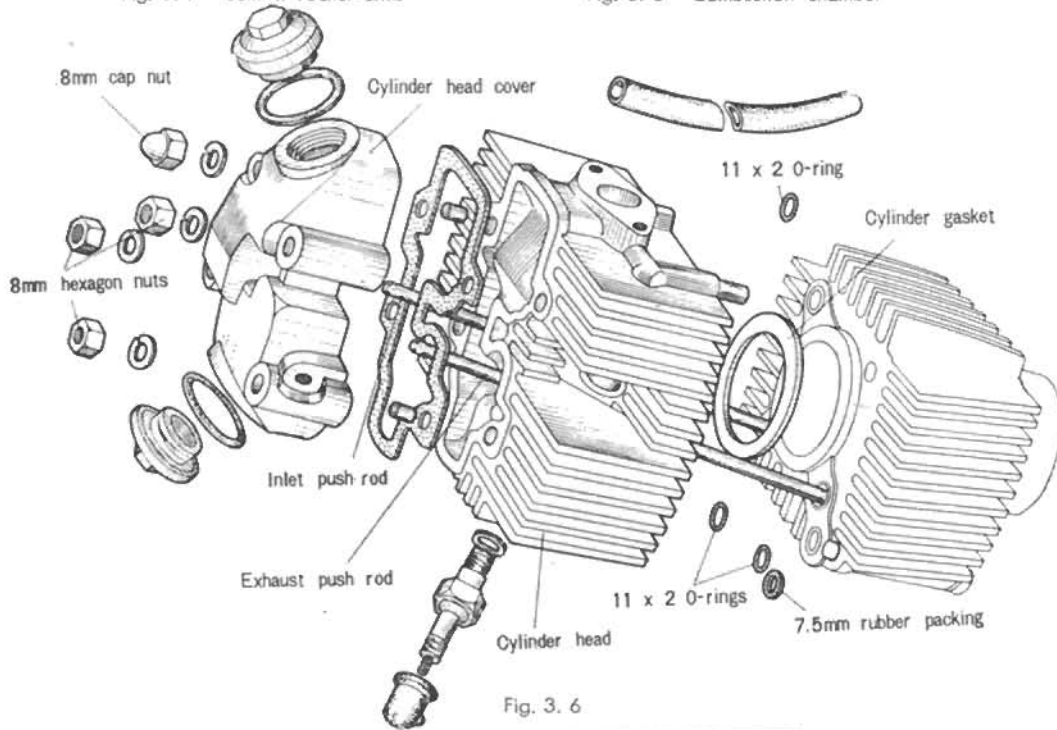


Fig. 3.6

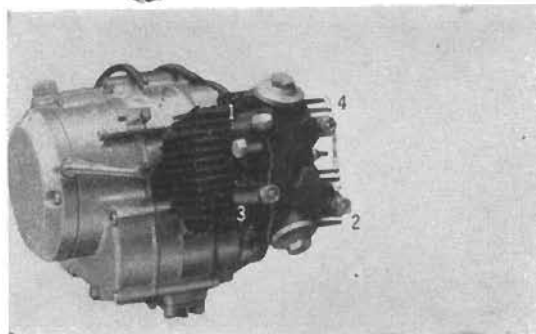


Fig. 3.9 Sequence of tightening nuts for securing cylinder head cover

D. Construction of Rocker Arms

The rocker arm is an important part as it transmits motion from the push rod to the valve by pressing the adjusting screw downward. It is made of chromemolybdenum steel and the part that contacts the push rod is cementation treated and finished by grinding.

E. Disassembling

1. Remove cylinder head cover as described in 3-2 B 1.
2. Remove rocker arm shaft bolt and pull out shaft. Rocker arm can be removed from cylinder head cover.

F. Assembling

Place rocker arm in position, insert shaft, tighten bolt and fit cylinder head cover as described in 3-2 C 3.

G. Construction of Valves

Each valve is made of heat-treated steel with high resistance to heat. Special consideration was given to the valve strength and ability to withstand wear at high temperatures.

The tightness of the valve has a direct bearing on the output and low speed stability of the engine. An exhaust valve is subjected to high temperatures from exhaust gases and tends to warp and fail to contact the valve seat perfectly. The guide is also subjected to high temperatures, preventing the formation of an oil film, resulting in wear of the guide and valve stem. The inlet valve is cooled by the gas/air mixture entering the engine, but it is subject to a partial vacuum when the mixture is sucked into the engine, so that lubrication oil tends to enter the combustion chamber through the guide. The inlet valve seats tightly and wear of the guide and valve stem is slow.

To reduce these inherent troubles in valves to a minimum, special care was taken in design. For the exhaust valve, the head was made small to give good heat radiation and the clearance between the valve stem and guide is comparatively large to prevent wear. For the inlet valve, the head is large for higher efficiency and the clearance between the valve stem and guide is as small as possible to prevent oil from getting into the combustion chamber.

H. Disassembling

1. Remove cylinder head as described in 3-2 B 3.
2. Remove valves with valve lifter as shown in Fig. 3-14.

I. Assembling

1. Apply oil to the valve stems before inserting valves in cylinder head. (Fig. 3-15) As there are no valve guides, take care not to scratch the wall of the guides in the cylinder head.
2. Mount cylinder head cover as described in 3-2 C.

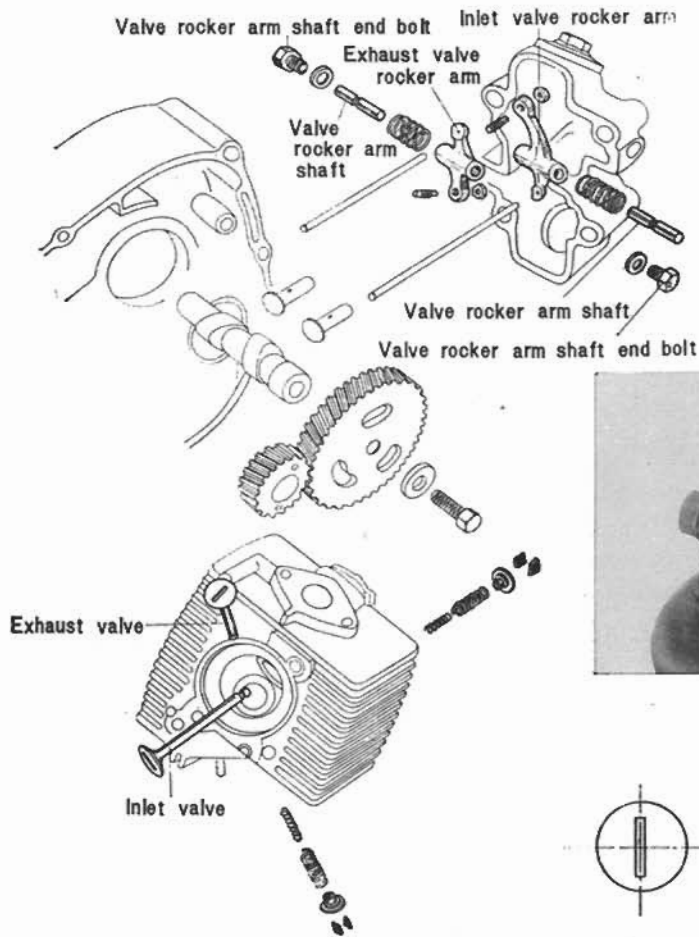


Fig. 3. 10

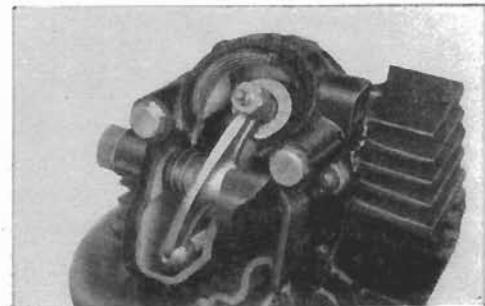


Fig. 3. 11 Rocker-arm

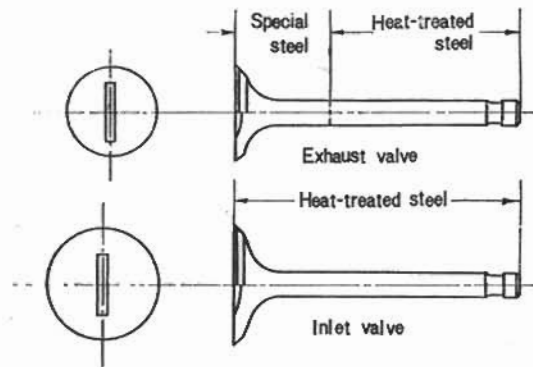


Fig. 3. 12 Valve

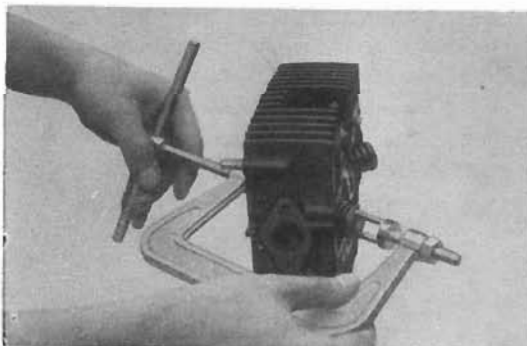


Fig. 3. 13 Removing valve

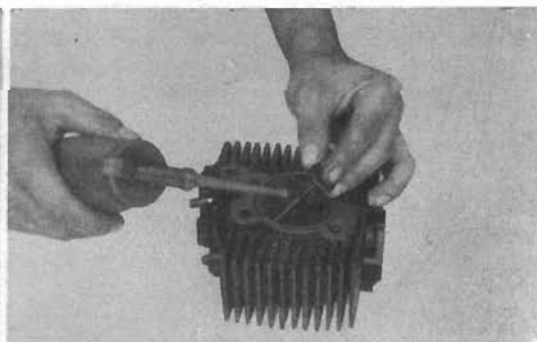


Fig. 3. 14 Applying oil

3-3 CYLINDER, PISTON AND PISTON RINGS

A. Construction

The cast iron cylinder has a lubrication oil channel to the cylinder head cover, push rod holes and lubrication oil return passage. Each gasket has an O-ring to effectively prevent oil leaks.

The cylinder is subject to wear due to the movement of the piston sliding up and down against the cylinder wall. Wear is greatly accelerated when dust in the air or dirt or mettalic particles in the oil get into the cylinder. Therefore the proper servicing of the air cleaner and oil filter is necessary.

The piston receives the explosive energy of the gas/air mixture and transmits rotating motion to the crankshaft through the connecting rod and crank pin. As it moves up and down in the cylinder at high speeds, special care must be taken in selection of the material of the piston.

In the Honda 90, the piston is made of cast aluminum alloy and is 1 mm elliptical in shape. As the piston is heated to high temperatures, considerable thermal deformation occurs and expansion toward the ends of the piston pin will lessen the clearance between the cylinder and piston. Therefore the clearance is most important. If the clearance is too large, a strong shock will be caused when the piston reverses its motion at the top and bottom of the stroke, causing the piston to slap against the cylinder and allowing oil up into the combustion chamber from the crankcase. If the clearance is too small, the formation of a lubricating oil film on the cylinder wall is prevented, causing piston seizure or at least lowering output through increased friction loss.

Along with the cylinder and piston, the piston rings have great bearing on pressure in the combustion chamber and prevention of crankcase oil from getting into the combustion chamber.

The piston rings are made of special cast iron. The top and second rings serve to maintain compression, while the oil ring scrapes oil from the cylinder wall. All the rings also transfer heat from the piston to the cylinder.

Wear of the top ring is especially rapid as it is subjected to high temperatures from the exploding gas mixture. Therefore, it is coated with hard chrome to improve its resistance to wear. The second ring increases the area of cylinder in contact and decreases the pressure per unit so that it expands to fit closely against the cylinder wall rapidly. The oil ring has a concave section shape to scrape oil off of the cylinder wall effectively.

The clearance between the ends of the rings must be correct. Too small clearance will allow the ring ends to contact when heated and bulge against the cylinder wall, causing increased friction loss or seizure. Too large clearance will allow combustion pressure to escape into the crankcase or oil to come up into the combustion chamber.

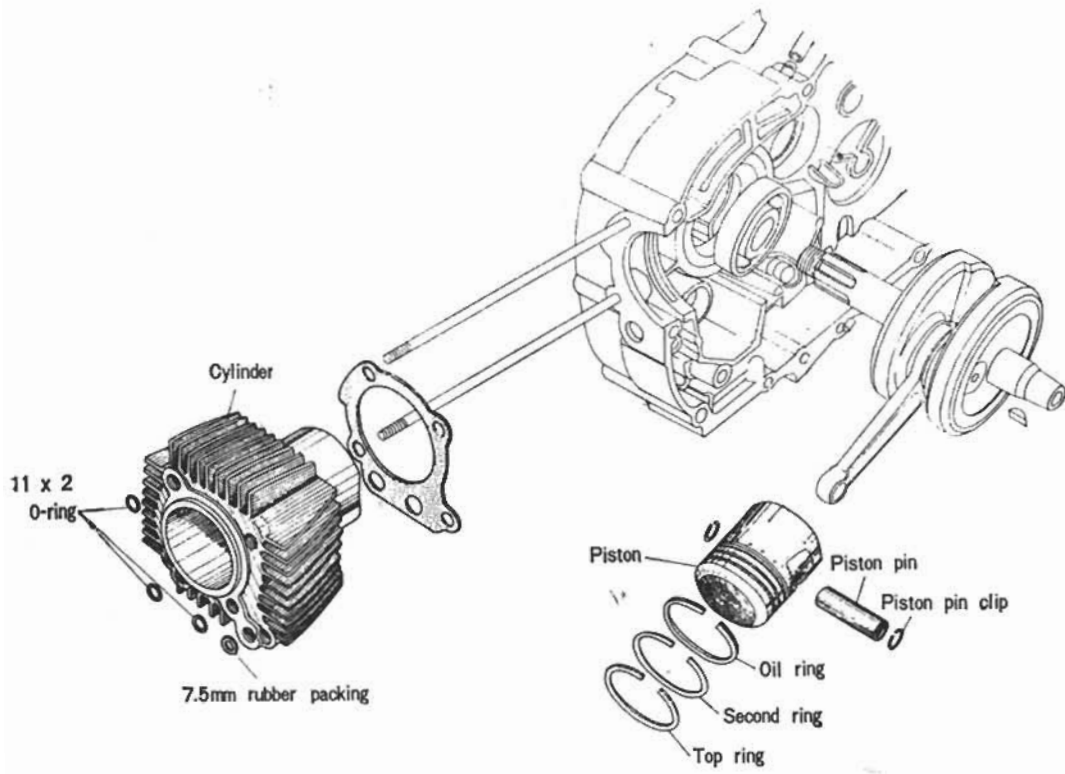


Fig. 3. 15-A

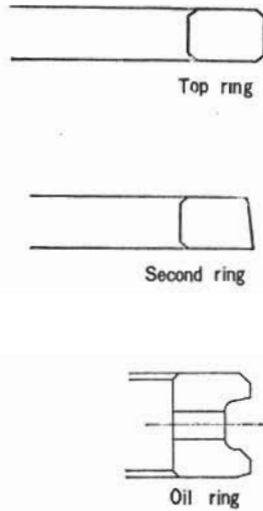


Fig. 3. 15-B Cross section of piston ring

B. Disassembling

1. Remove cylinder head cover and cylinder head as described in 3-2 B. Cylinder can be removed from cylinder stud bolts.
2. To remove piston, take off one piston pin clip and push the piston pin out. The piston can be removed from the connecting rod.

CAUTION

Be careful not to drop the piston pin clip into the crankcase when removing it.

3. Use a ring remover or carefully spread each ring with the thumbs of both hands to take it out of the groove and off of the piston. Be careful not to twist the piston ring or scratch the piston.

C. Assembling

1. It is advisable to use a guide as shown in **Fig. 3-19** when fitting piston rings to the piston.

CAUTION

- a. Do not fit piston rings upside-down. An improperly fitted ring sometimes scrapes oil up into the combustion chamber instead of down into the crankcase.
- b. When fitting a new piston ring, first check the clearance in the piston ring groove as shown in Fig. 3-21.

2. Fit piston by inserting piston pin through connecting rod small end and fasten the piston pin clip securely.

CAUTION

- a. The arrow on the top of the piston must point forward. (Fig. 3-22)
- b. Piston pin slip fits into piston and connecting rod and can be pushed into position with your fingertips.
- c. Always use a new pistonpin clip every time a clip has been removed from the piston pin.

3. Fit cylinder.

CAUTION

- a. The piston ring end gaps should be positioned about 120° apart
- b. When fitting the cylinder over the piston, take care not to break a piston ring or scratch the cylinder wall.

4. Fit cylinder head and cylinder head cover as described in 3-2 C.

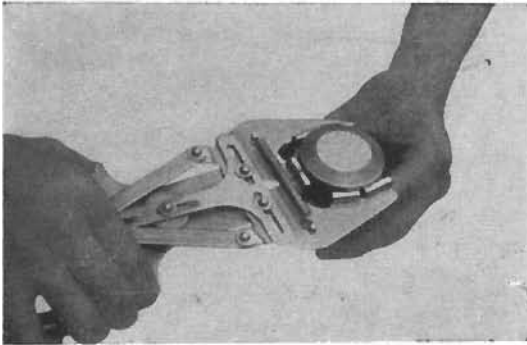


Fig. 3. 17 Removing piston ring

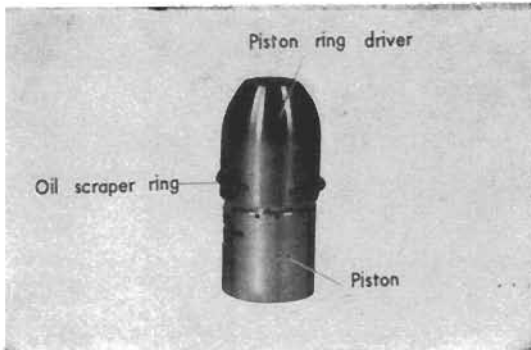
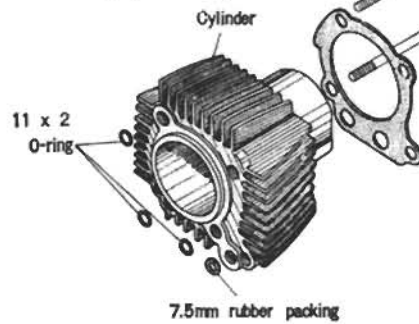


Fig. 3. 18 Fitting piston ring



Fig. 3. 20 Checking fit piston ring

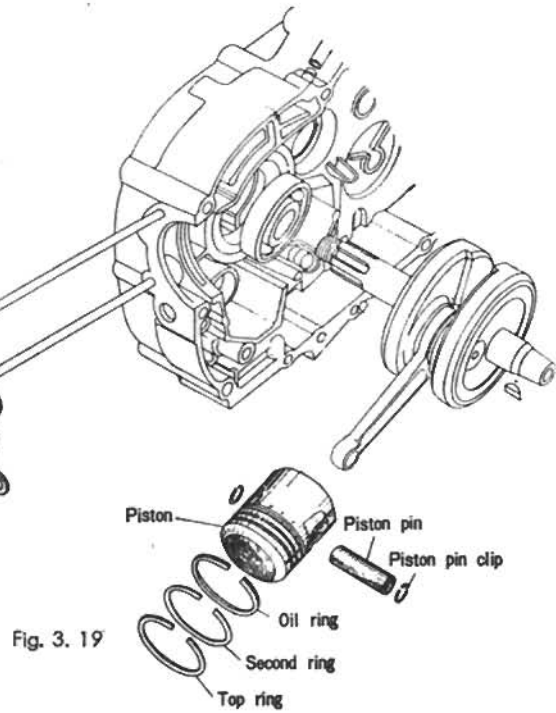


Fig. 3. 19

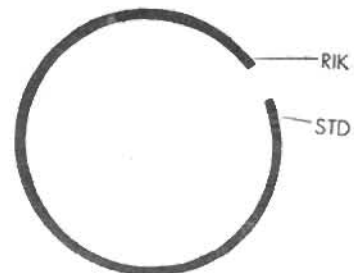


Fig 3. 19 Marks to indicate the upper surface

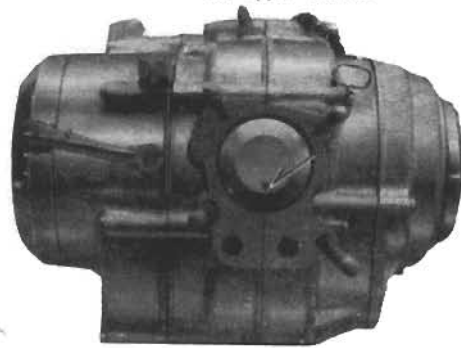


Fig. 3. 21 Mounting piston

3-4 LEFT CRANKCASE COVER

A. Construction

The die cast aluminum alloy left crankcase cover contains the contact breaker assembly, condenser and protects the AC dynamo rotor and stator assembly from damage from water, dust, etc.

B. Removing AC Dynamo Rotor

1. Remove contact breaker cover and detach primary cord from contact breaker assembly.
2. Remove left crankcase cover.
3. Disconnect wire from neutral switch and remove AC dynamo stator.
4. Remove dynamo stator bolt and spark advancer.
5. Remove dynamo rotor with a dynamo rotor puller as shown in Fig. 3-24.

CAUTION

Take care not to cause a shock to the crankshaft when removing dynamo rotor.

C. Installing

1. Make sure the rotor is not dirty, insert a woodruff key in the slot on the crankshaft and mount the rotor.
2. Fit spark advancer and tighten dynamo stator bolt.
3. Install dynamo stator and connect wire to neutral switch.
4. Fit left crankcase cover and connect primary cord to contact breaker assembly.
5. Adjust ignition timing. (Refer to 3-9 B)
6. Attach contact breaker cover.

D. Removing Drive Sprocket

Use a drive sprocket holder to prevent it from turning and remove 6 mm phillips screw. Drive sprocket can be removed from transmission countershaft. (Fig. 3-25)

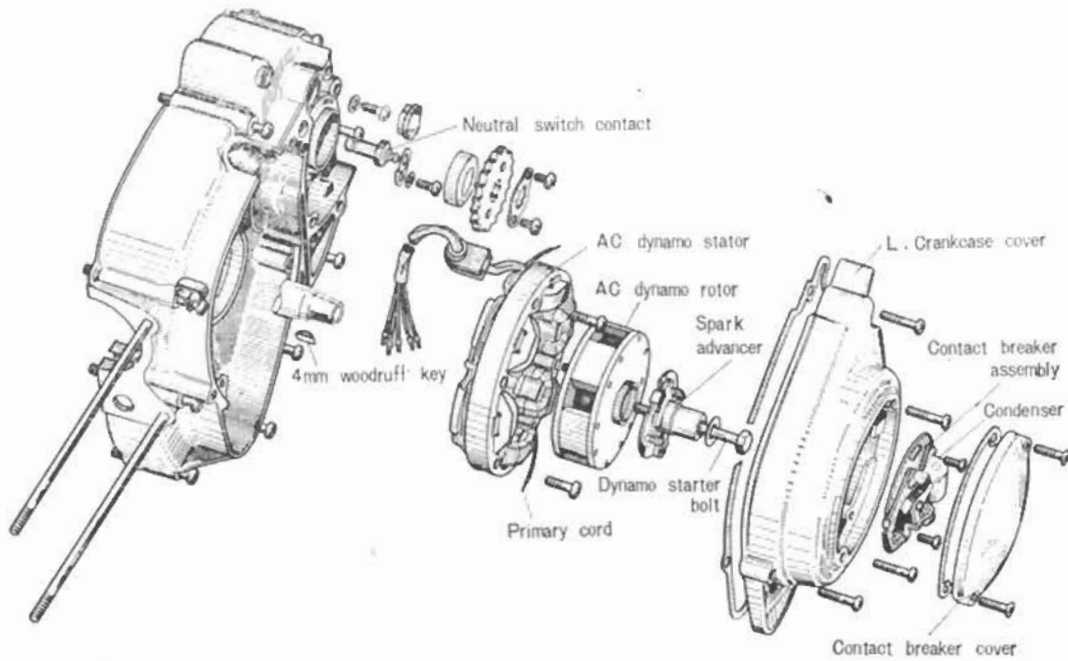


Fig. 3. 22

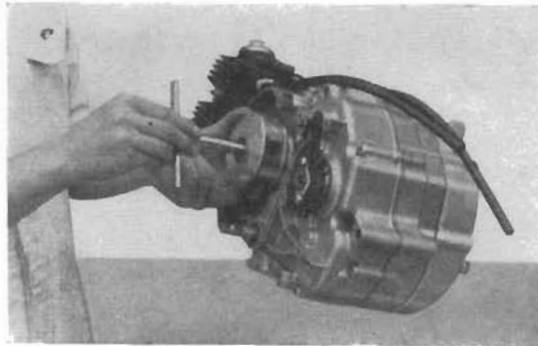


Fig 3. 23 Removing AC dynamo



Fig. 3. 24 Removing drive sprocket

E. Construction of Oil Pump and Passage

There are several ways of lubricating engines. The splash method employs a spoon on the connecting rod big end to throw oil onto the crankshaft, cylinder, etc. The pump method supplies force fed oil to the crankshaft, cylinder head, etc. The pump and splash method combines these two systems. The pump method uses a plunger or gear pump. The dry sump method uses two pumps, one supplying oil and one recovering oil from the crankcase. The wet sump system utilizes the crankcase as the oil reservoir.

In the Honda 90 engine, the crankcase is used as an oil reservoir from which a cam shaft driven gear pump delivers oil for lubricating all parts.

Oil taken from the crankcase through the oil filter is force fed by the gear pump through the left crankcase to the transmission main shaft. Oil is also pumped through the transmission countershaft to the lower part of the right crankcase and the right crankcase cover.

From the right crankcase cover, oil is fed to the clutch cover, oil passage, oil filter and crankshaft. Another channel feeds oil from the right crankcase cover to the timing gear, cam gear, engagement of drive gear and primary driven gear. Another channel takes oil to the cylinder, cylinder head and cylinder head cover before it returns to the crankcase through oil holes in the cylinder head and cylinder. (Fig. 3-28)

F. Disassembling

1. Remove dynamo stator as described in 3-4 B 3.
2. Remove 5 mm phillips screw and oil pump can be removed from left crankcase.

G. Assembling

1. Fit the hole of oil pump drive gear shaft to the cam shaft dowel pin and attach the oil pump side cover.
2. Place oil pump driven gear in position and fit oil pump body.
3. Install dynamo stator and left crankcase cover as described in 3-4 C.

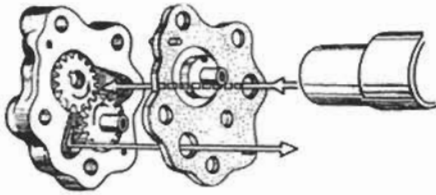


Fig. 3. 26 Oil pump

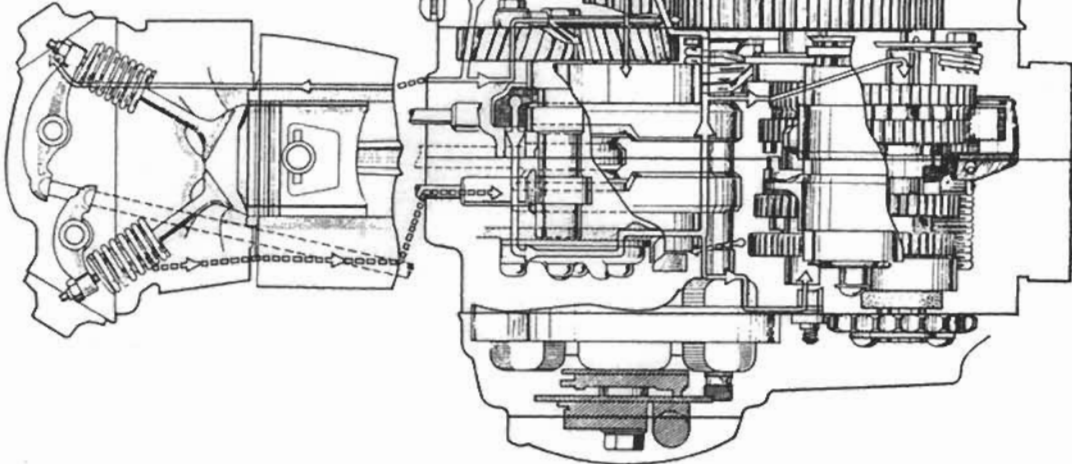


Fig. 3. 27 Passage of lubricant

(Please color the passage with a color pencil, etc)

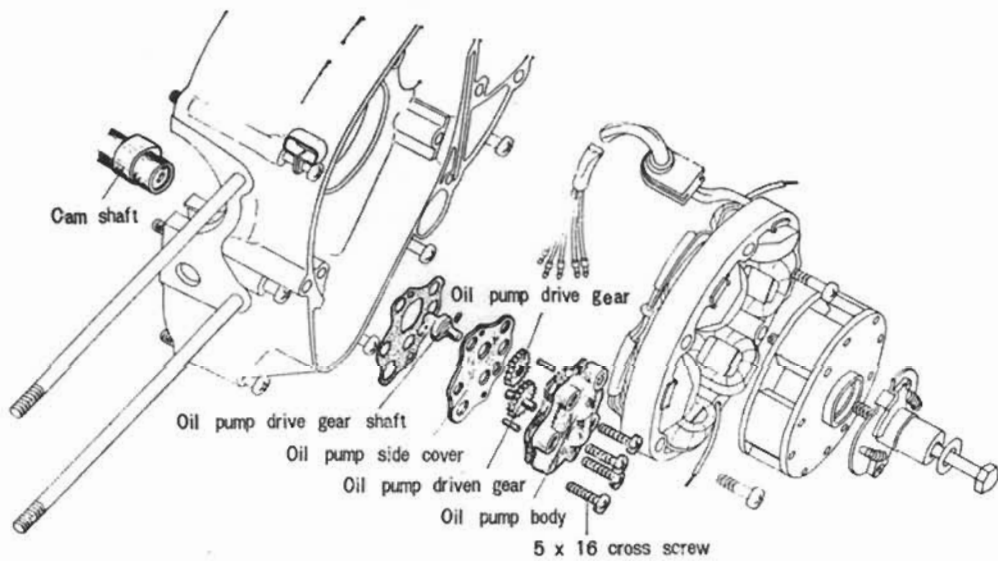


Fig. 3. 25

3-5 RIGHT CRANKCASE COVER

A. Construction

The diecast aluminum alloy right crankcase cover has oil inside at the same level as in the crankcase and is equipped with an oil level gauge.

An oil passage for supplying lubrication oil from the oil pump through the crankcase to the cylinder head, gear engagements, clutch cover and crankshaft is provided.

A drain plug is installed in the lower front part of the cover.

B. Construction and Operation of Clutch

A clutch is located between the engine and transmission to transmit power or break the power transmission as needed for changing speeds, starting engine, etc. Important points are the degree of engagement perfection, ability to disengage completely, smoothness of engagement and disengagement, lack of drag when disengaged and lack of slippage when engaged.

There are several types of clutches such as cone, centrifugal, single-plate, multi-plate, etc. These are further classified into wet type and dry type, with the former having the clutch mechanism immersed in an oil bath and the latter not having oil inside the clutch.

The Honda 90 clutch is a wet multi-plate type. As shown in **Fig. 3-29** and **Fig. 3-30**, the clutch outer case is located beneath the right crankcase cover. The clutch is made up of clutch springs, drive plate, clutch plates and friction discs. The friction discs have teeth inside to fit to the clutch center so that they revolve with it. The clutch plates have dog teeth on the outer edges so that they fit into the clutch housing and turn with it, along with the drive plate. The drive plate has grooves on the inside which fit it to the crankshaft, which the drive center engages with the drive gear by the clutch center guide and can rotate freely on the crankshaft. When the clutch lever on the handlebar is pulled, the clutch wire pulls the clutch lever fitted to the clutch assembly, working against the clutch springs to free the friction discs and clutch plates from one another. When it is released, the force of the clutch springs pushes the friction discs and clutch plates together so that they rotate together from friction, transmitting the rotation of the crankshaft through the drive plate, clutch plates, friction discs, clutch center, drive gear and primary driven gear to the transmission gears. A damper spring prevents noise in the clutch and keeps the teeth from breaking.

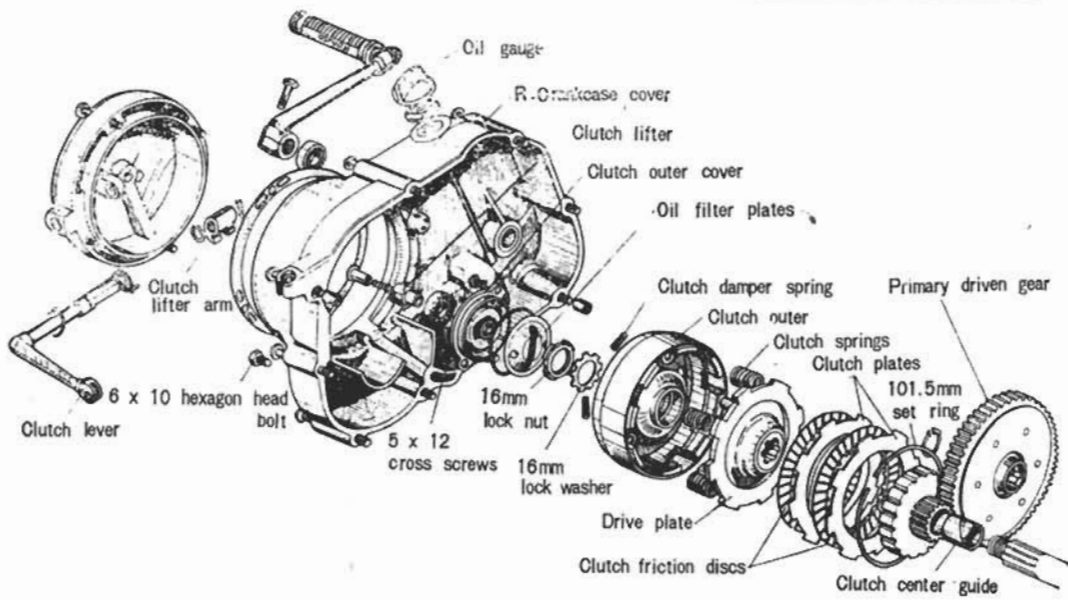


Fig. 3. 28

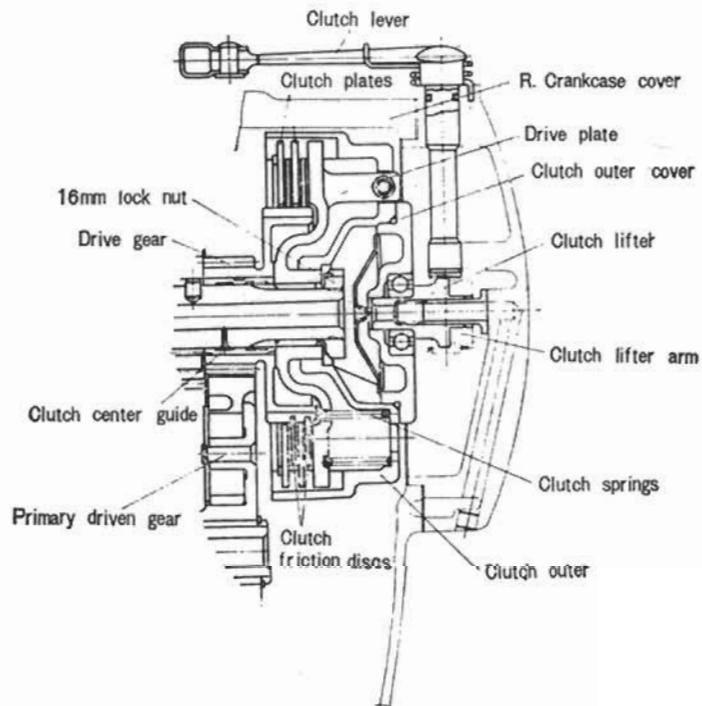


Fig. 3. 29 Cross Section of clutch

C. Construction of Oil Filter

An oil filter is installed in the clutch outer case. Oil fed from the clutch cover through an oil passage is cleaned by centrifugal action by the ribs as shown in the diagram and clean oil is supplied to the crankshaft.

D. Disassembling

1. Remove right crankcase cover.
2. Remove clutch lifter, take out 5 mm phillips screw and detach clutch outer case and oil filter plates.
3. Flatten the folded edge of 16 mm lock washer and remove 16 mm lock nut. Clutch assembly can be removed from the crankshaft. (Fig. 3-32)
4. As shown in Fig. 3-33, hold the clutch outer case with a special tool and free retainer ring by compressing drive plate. Clutch assembly can be disassembled.

CAUTION

When holding the clutch outer case with special tool, be sure not to hold the drive plate portion on which the damper spring is mounted, as the drive plate cannot be depressed in this case.

E. Assembling

1. Assemble clutch springs, drive plate, friction discs and clutch plates in clutch outer case and attach retainer ring by compressing drive plate as described in 3-5 D 4.

CAUTION

When installing the retainer ring, be sure to keep the teeth of the friction discs lined up, otherwise the ring cannot seat properly.

2. Fit clutch damper spring.
3. Mount the clutch assembly on the crankshaft along with drive gear and clutch center guide and fix them with lock nut.

CAUTION

The lock washer must be folded up against the nut after the nut is tightened. If the position of the folding section of the washer does not line up with the flat side of nut, never loosen the nut but tighten it further until the washer matches.

4. Mount oil filter plates and clutch outer cover case.
5. Fit right crankcase cover.

CAUTION

Be sure to tighten the 6 mm screws uniformly.

6. Fit clutch cover, making sure clutch lifter and oil passage are lined up correctly.

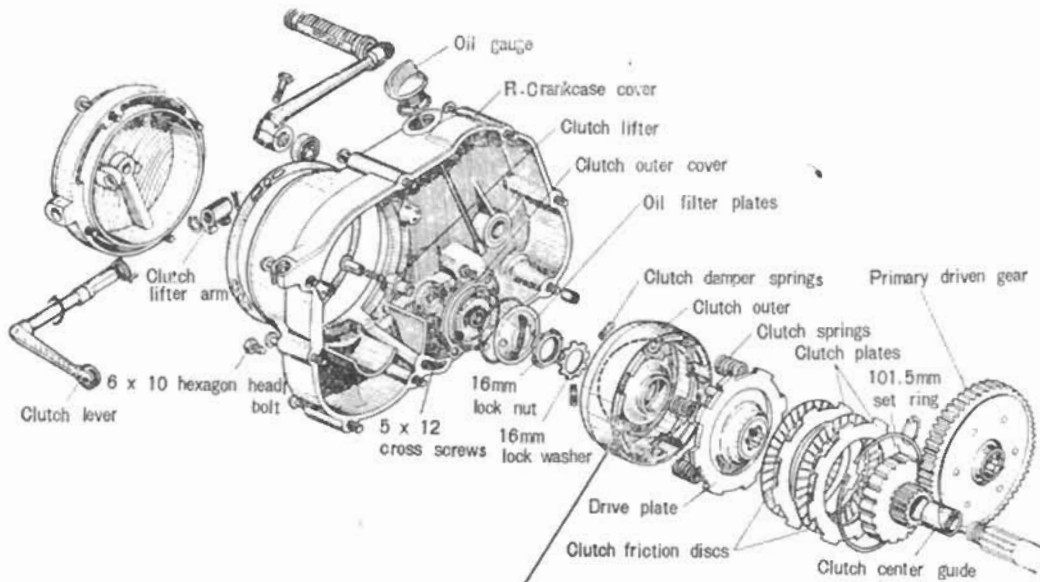


Fig. 3. 30-A

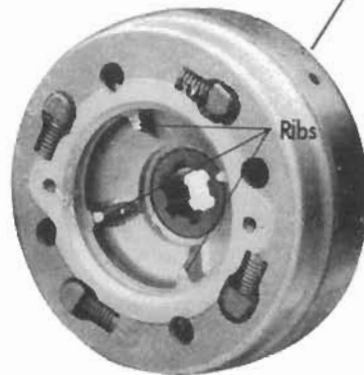


Fig. 3. 30-B Oil filter provided in clutch outer

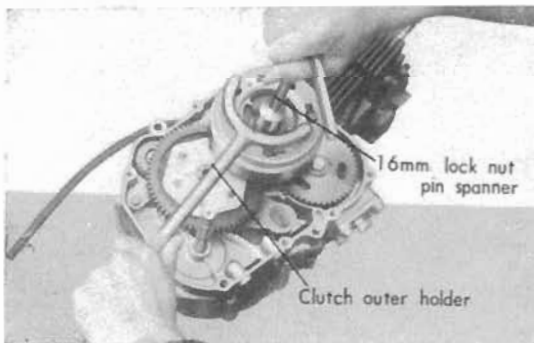


Fig. 3. 31 Removing 16 mm lock nut

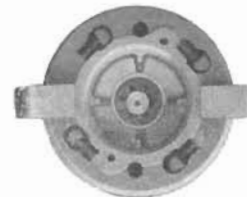


Fig. 3. 32 Disassembling clutch

F. Construction of Cam Shaft, Valve Lifters and Valve

The cam shaft is made of malleable cast iron and the cam and shaft are heat treated and finished by grinding. Both ends of the cam shaft are supported by bearings in the crankcase. A cam gear is bolted to one end and engages the timing gear, which is shrink-fitted to the crankshaft and driven at a 1 : 2 reduction ratio. A 2.5 x 10 mm pin on the other end of the cam shaft drives the oil pump. (Fig. 3-34)

The cam is an important part which directly affects the performance of the engine. As it is likely to cause noise, care must be taken to adjust the tappet clearance correctly to obtain maximum performance from the engine.

The cam has an anti-shock lift curve structure of considerable range before the valve is lifted to prevent shock and noise.

Tappet clearance must be adjusted to the correct clearance when the dynamo rotor "T" mark matches the mark on the dynamo stator, as in this position the valve lifter rides on the cam base circle. Do not try to adjust tappet clearance when the valve lifter rests on the anti-shock curve of the cam, since such an adjustment is far from correct.

The valve lifters are made of high carbon chrome steel and the cam contacting surfaces are heat treated and finished by grinding. The lifters are supported by the crankcase and work to convert the rotary motion of the cam shaft into reciprocal linear motion. The lifters are mounted eccentrically with the center line of the cam so that they rotate around their own axis, preventing localized wear of the cam contacting surfaces.

The exhaust and inlet valves are mounted in a V shape against the combustion chamber and operated by the cam gear through the cam shaft, valve lifters, push rods and rocker arms. The mechanism is basic to a 4-cycle overhead valve engine and is designed to operate smoothly at high speeds with sufficient lubrication. (Fig. 3-36)

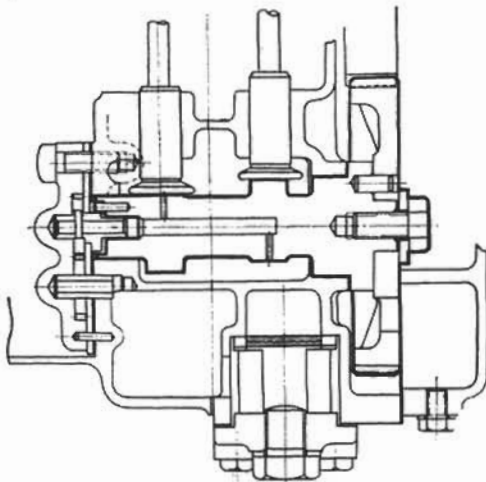


Fig 3.33 Cross view of camshaft assembly

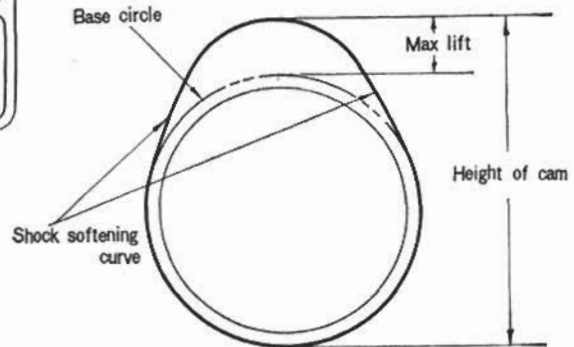


Fig 3.34 Cam

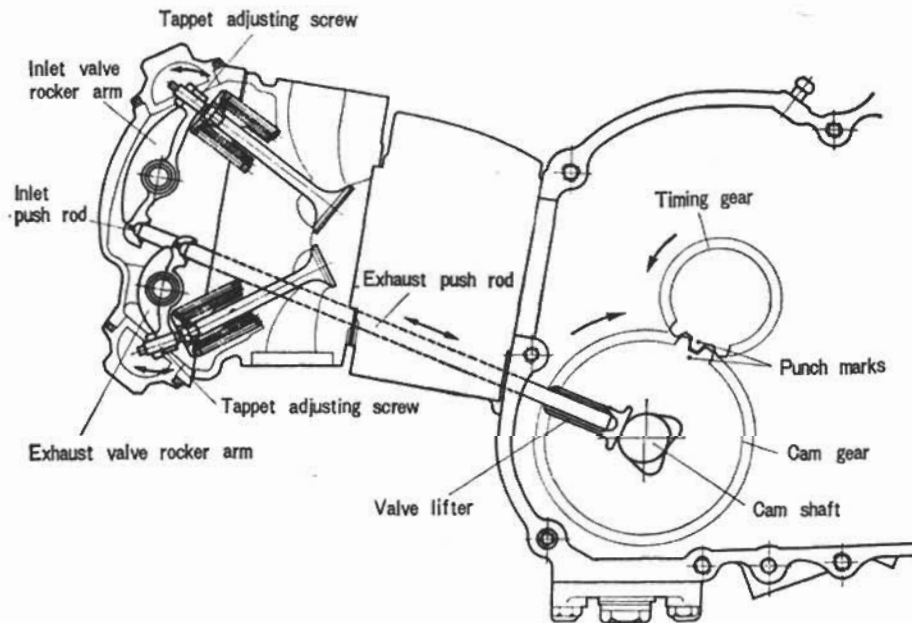


Fig 3.35 Illustration of cam and valve operation

G. Disassembling

1. Remove clutch assembly as described in 3-5 C.
2. Detach oil pipe.
3. Remove cam gear and cam shaft together, after setting the piston at top dead center.
4. The cam gear can be taken from the cam shaft by loosening the 6 mm cam gear retaining bolt.

H. Assembling

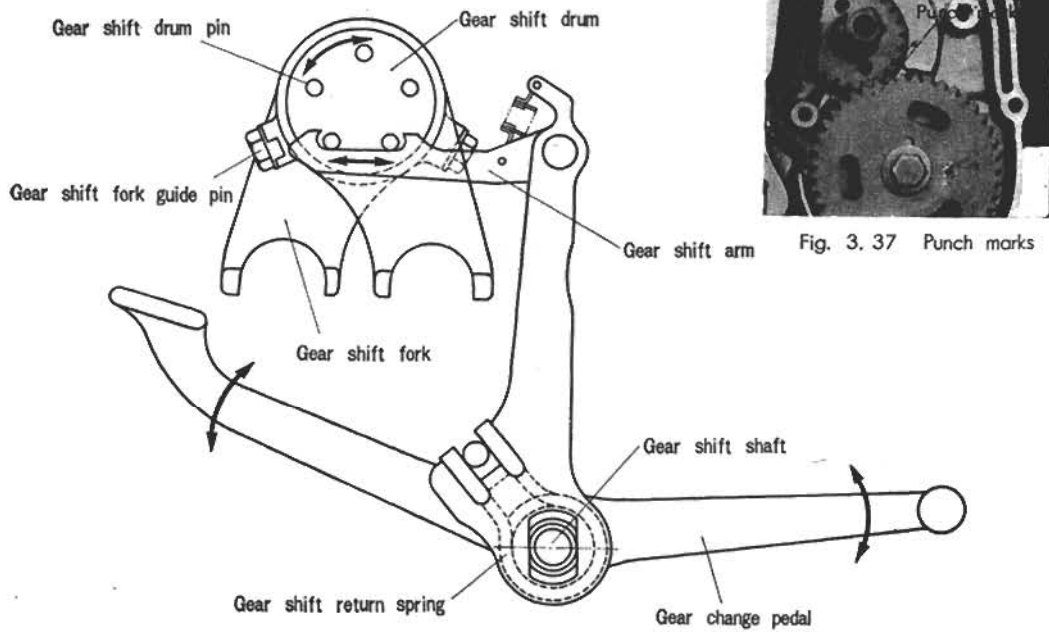
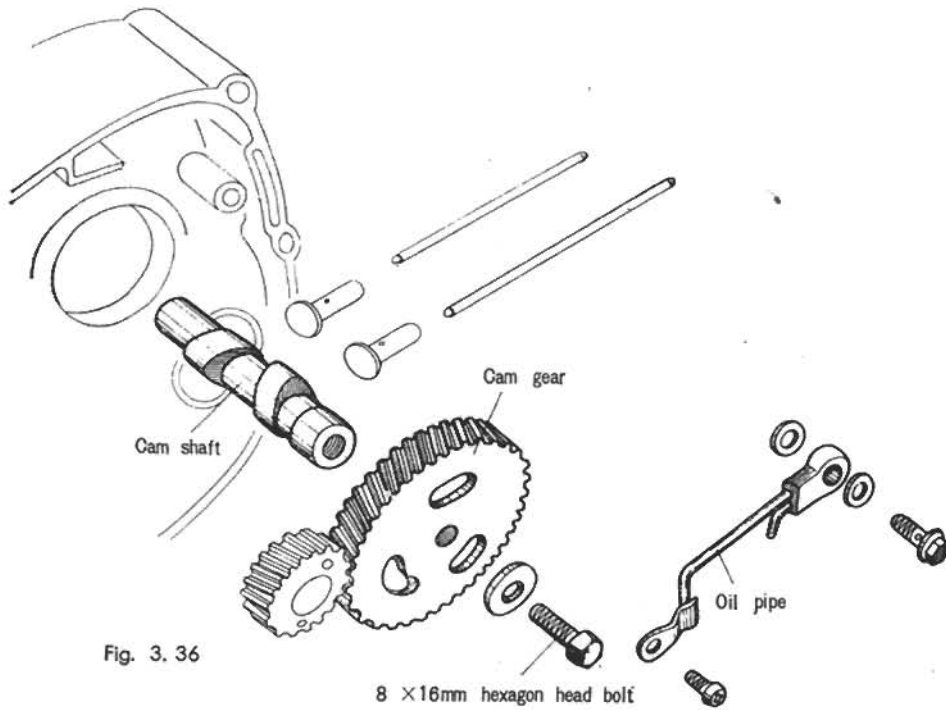
1. Fit cam gear to cam shaft and tighten bolt.
2. Match the punch marks and install cam shaft. (Fig. 3-38)

CAUTION

- a. Incorrect assembling of the cam shaft will prevent the engine from starting, cause piston to hit the valves or cause erratic running, so take care to assemble the cam shaft correctly.
 - b. As the cam shaft also drives the oil pump, check to see that it couples with the pump properly.
3. Attach oil pipe.
 4. Assemble clutch as described in 3-5 D.
 5. Adjust tappet clearance. (Refer to 3-9 A)

I. Shift Mechanism

The shift mechanism uses a combination of linear and rotary motions. When the gear change pedal is depressed, the gear shift shaft is rotated. (Fig. 3-39) The gear shift arm causes the drum to rotate by pushing against the drum pin attached to the gear shift drum at the tip of its pawl. A shift fork is fitted to the shift drum by the tip of the shift fork guide pin fitting into two grooves in the mid portion of the drum. Rotation of the drum moves the shift fork to the right or left, moving the shifter and shifting the gears. A gear shift return spring returns the change pedal to its original position.



J. Disassembling

1. Remove clutch as described in 3-5 C.
2. Remove 18 mm circlip and primary driven gear. Shift mechanism can be seen.
3. Remove shift drum stopper and pull gear shift drum forward as shown by the arrow in the diagram. (Fig. 3-41) The shift mechanism can be removed.

K. Assembling

1. Assemble gear shift shaft in the reverse procedure from that described in 3-5 J 3.

CAUTION

When assembling, check the movement of the three parts shown with arrows and also check to see that the shift return spring is not bent. (Fig. 3-42)

2. Place shift drum stopper in position and install driven gear.
3. Fit clutch assembly and right crankcase cover as described in 3-5 D.

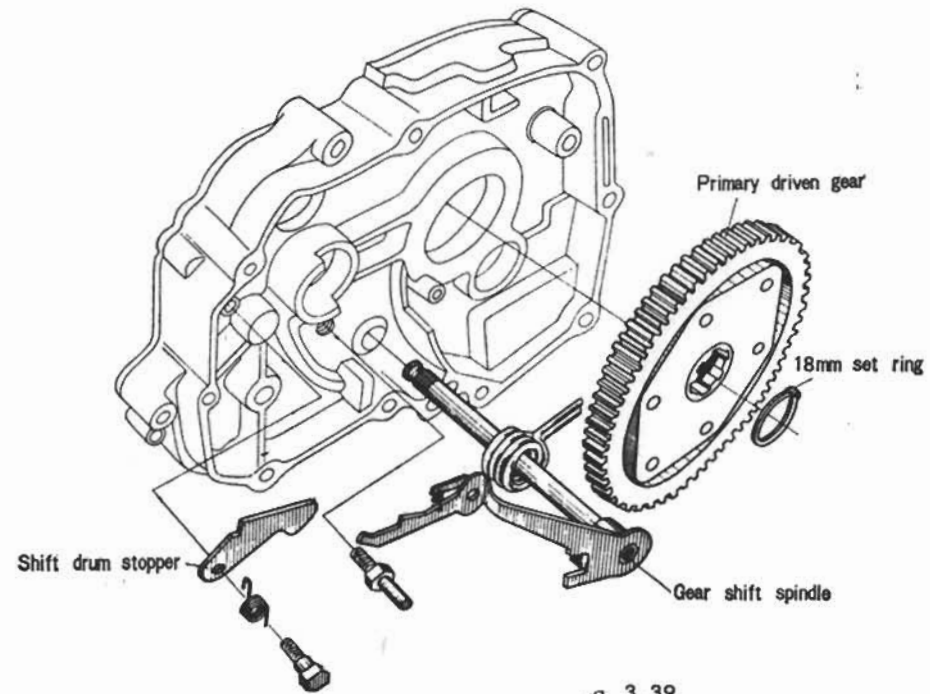


Fig. 3. 39

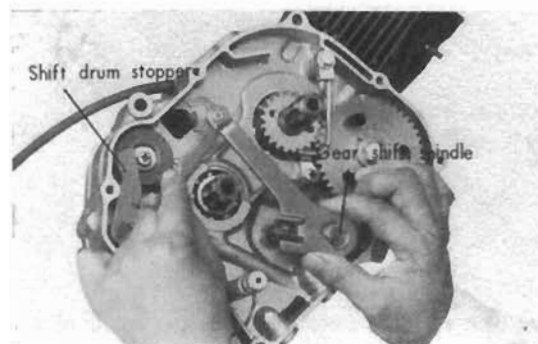


Fig. 3. 40 Removing gear shift spindle-

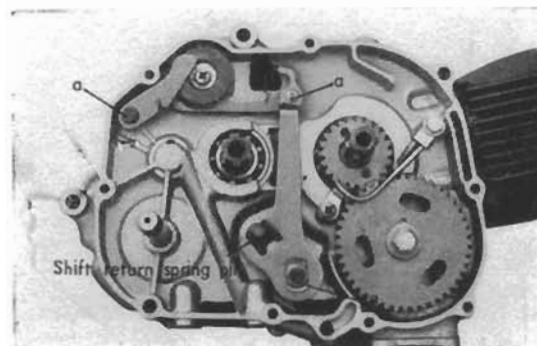


Fig. 3. 41 Checking the motions of three points after assembling gear shift spindle

3-6 CRANKSHAFT AND CONNECTING ROD

A. Construction

The right and left crankshafts are made of carbon steel and are fitted to a crank pin made of nickel-chrome-molybdenum steel. The crankshaft is supported by ball bearings at two points.

A timing gear driving the cam shaft is shrink-fitted on the right crankshaft.

The connecting rod transmits the reciprocating motion of the piston to the crank pin and thus to rotary motion of the crankshaft. The rod is made of chrome-molybdenum steel and has a H-section shape. No bushings are used at either end. The big end is finished by grinding and contains 2.5 x 8.5 mm rollers held in a strong aluminum alloy retainer.

B. Disassembling

1. Remove cylinder head cover and cylinder head as described in 3-2 B. Remove cylinder as described in 3-3 B.
2. Remove cam shaft as described in 3-5 G and remove gear shift shaft as described in 3-5 J.
3. Remove dynamo stator and rotor as described 3-4 B.
4. Place the crankcase with the left side down and separate the two sides by removing the 6 mm phillips screws joining the two parts of the crankcase.
5. Remove crankshaft assembly and piston from left half of crankcase.
6. Remove timing gear as shown in Fig. 3-44.

C. Assembling

1. Install timing gear.

CAUTION

When driving in timing gear, support the center of the crankshaft by hand or with a jig to keep the crankshaft in alignment.

2. Install crankshaft assembly in left half of crankcase.
3. Fit right crankcase to left crankcase with 6 mm phillips screws.

CAUTION

Be sure that both valve lifters are in position before fitting right side of crankcase.

4. Install gear shift shaft and primary driven gear as described in 3-5 K and install cam shaft, clutch and right crankcase cover as described in 3-5 H.
5. Install dynamo rotor and stator and right crankcase cover as described in 3-4 C.
6. Fit cylinder as described in 3-3 C and cylinder head and cylinder head cover as described in 3-2 C.

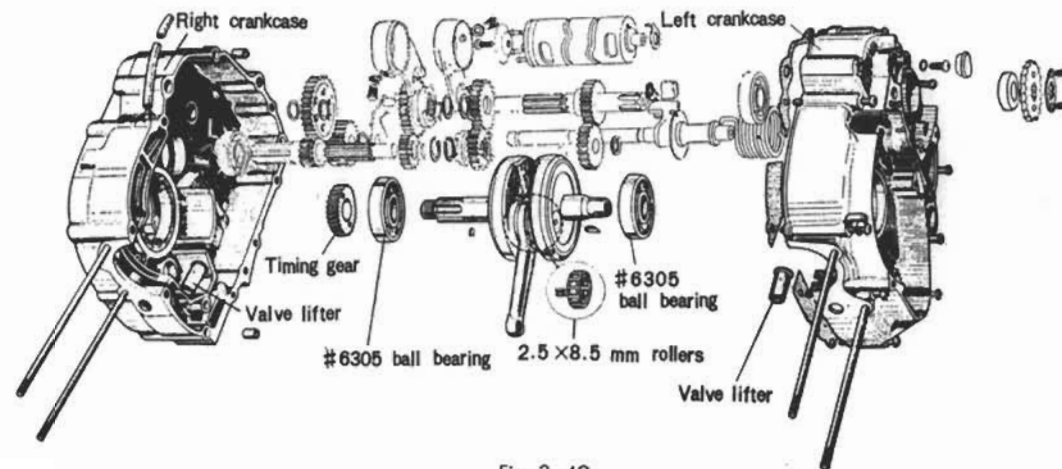


Fig. 3. 42

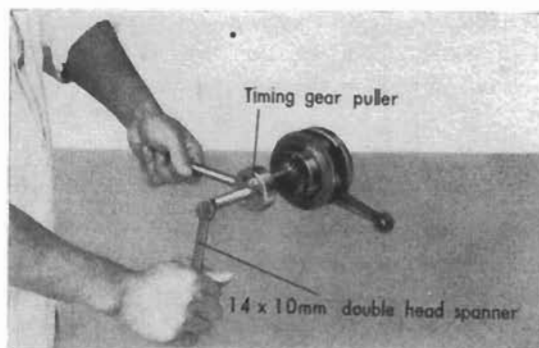


Fig. 3. 43 Removing timing gear

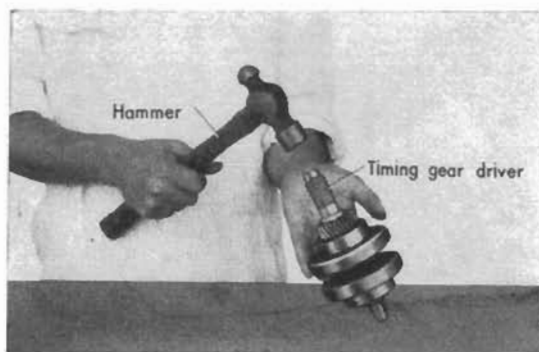


Fig. 3. 44 Driving timing gear into position

3-7 TRANSMISSION

A. Construction

The transmission transfers power from the engine to the drive sprocket and changes the torque by means of engaging gears having different numbers of teeth. As shown in Fig. 3-46, when the driving gear is small and the driven gear is large, the number of rotations of the driven shaft is small and a larger torque is transmitted. The ratio of teeth in engaging gears is termed the "reduction ratio". Fig. 3-47 shows the number of teeth in each gear of the Honda 90 transmission.

There are two types of gearing generally used for motorcycles, the selective slide type and the constant mesh type. In the selective slide type, the gear shift fork slides a shift gear to engage with different gears and change the reduction ratio. In the constant mesh system, pairs of gears are always engaged and permitted to rotate freely, and by action of the gear shift mechanism different pairs of gears are bound to the driven shaft, obtaining different reduction ratios.

The Honda 90 utilizes a 4-speed constant mesh transmission which transmits the output of the engine into power for acceleration and hill climbing.

The six transmission gears mounted on the main shaft and countershaft are fixed by splines in the rotating direction and set rings in the axial direction.

B. Operation

Low

Crankshaft power is transmitted to the primary driven gear through the clutch. The driven gear is spline-connected to the transmission main shaft and power is transferred to the countershaft low gear from the main shaft. The countershaft low gear rotates freely but when the spline-connected countershaft second gear is shifted by the gear shift fork towards the low gear the second gear dowel fits into the dowel hole on the low gear and binds the low gear to the countershaft through the second gear and power is transmitted to the drive sprocket fitted on the left end of the countershaft.

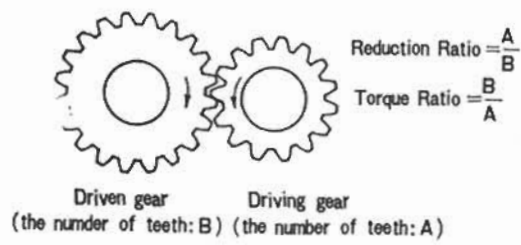


Fig. 3. 45

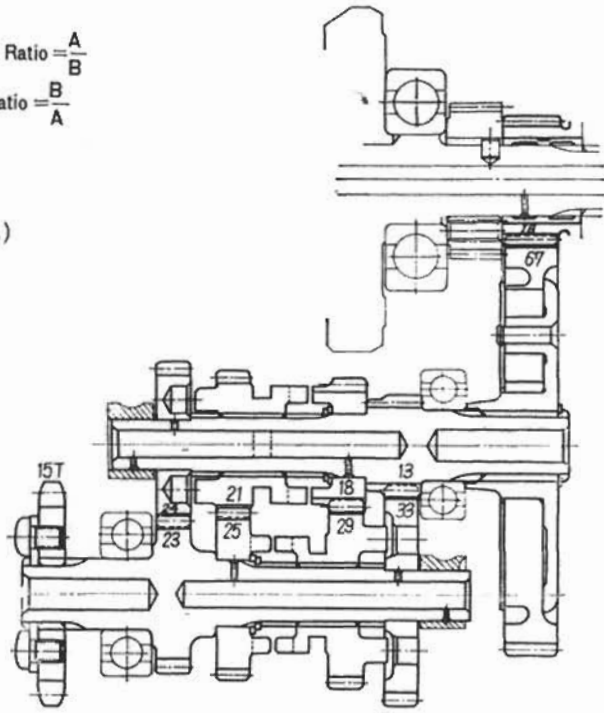


Fig. 3. 46

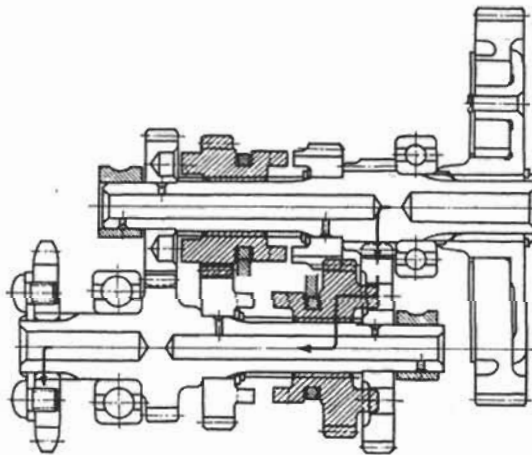


Fig. 3. 47 Low

Second

The spline-connected main shaft third gear is shifted toward the second gear and the third gear and second gear pawls bind them together. Power transmitted to the main shaft by the driven gear is transmitted through the third gear to the second gear which is engaged with the spline-connected second gear and power is transmitted by the countershaft to the drive sprocket.

Third

The spline-connected countershaft second gear is moved by the shifter toward the countershaft third gear and they are engaged by dog teeth. As the fixed main shaft third gear is engaged with the countershaft third gear, power transferred to the main shaft by the primary driven gear is transmitted by the main shaft third gear to the countershaft third gear and from it through the countershaft second gear to the countershaft and the drive sprocket.

Top

The spline-connected main shaft third gear is shifted toward the main shaft top gear and engages with a dowel so power transmitted to the main shaft by the primary pinion gear is transferred through the third gear and top gear to the countershaft and drive sprocket.

Neutral

Without any gears dowel-fitted together, the main shaft power is transferred to countershaft low and third gears which rotate freely and power is not transmitted to the countershaft.



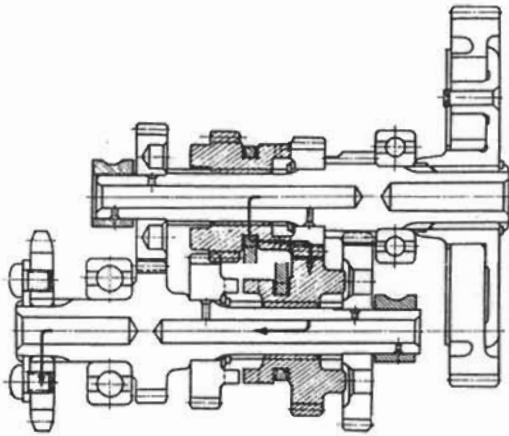


Fig. 3. 48 Second

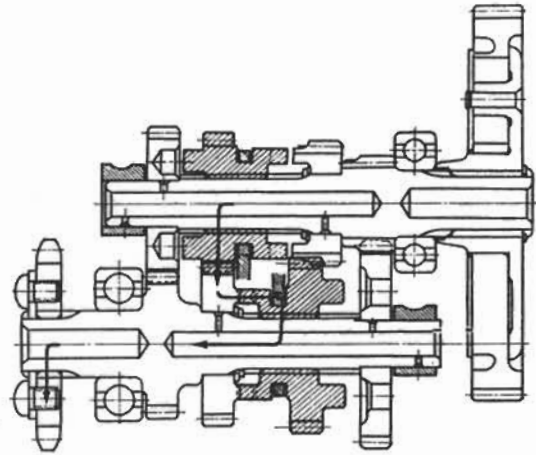


Fig. 3. 49 Third

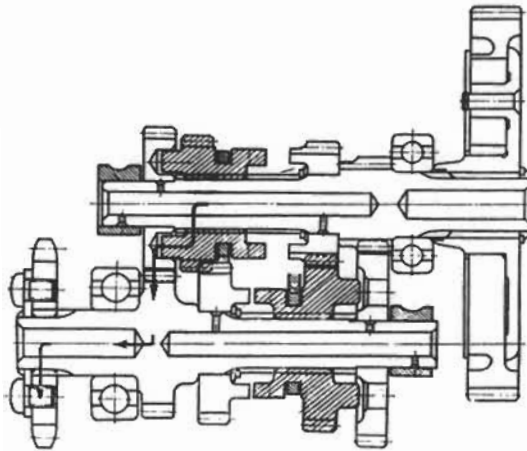


Fig. 3. 50 Top

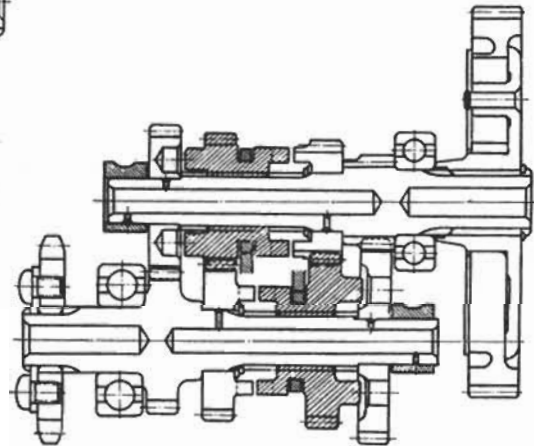


Fig. 3. 51 Neutral

C. Kick Starter

The kick starter pinion engages with the transmission low gear and by utilizing the transmission gears kicking is easy and does not require much force.

As shown in Fig. 3-53, when the kick starter shaft is rotated by the kicking action the serrated kick starter ratchet flange is rotated simultaneously and the pawl of the kick starter ratchet flange slides down from the kick starter guide and is pushed against the kick starter pinion groove by the pawl spring. Power is transferred from the kick starter pinion to the countershaft low gear.

When the kick starter is not depressed or the kick starter pedal is released after kicking, the kick starter ratchet flange is pushed back by the kick starter spring as shown in Fig. 3-54. The pawl rests on the kick starter ratchet guide and the kick starter pinion is freed.

Fig. 3-55 shows the operation of gears from the crankshaft.

D. Disassembling

1. Remove right crankcase as described in 3-6 B. The transmission can be seen.
2. Take out the kick starter shaft.
3. Take out 19 mm rubber plug in left crankcase, remove 6 mm phillips screws and remove drive sprocket as described in 3-4 D. The main shaft, countershaft and gear shift drum can be removed in one unit.
4. Flatten the shift fork pin lock washer and remove gear shift fork guide pin. Gear shift fork can be removed from gear shift drum.

E. Assembling

1. When assembling transmission gears, care must be taken to fit the gears properly with spline-connected gears properly fitted. Be sure to insert thrust washers for gears which are bound in axial direction. Check to make sure the gears rotate freely after assembling.
2. Fit gear shift fork to gear shift drum, attach gear shift fork guide pin and fold up the lock washer carefully.
3. Install the transmission main shaft, countershaft and gear shift drum in the crankcase in one unit. Be sure to place 14 mm thrust washers in position.
4. Install kick starter shaft.
5. Fit right crankcase, tighten 6 mm phillips screws and insert 19 mm rubber plug.
6. Install dynamo rotor and stator, fit left crankcase cover and drive sprocket as described in 3-4 C.
7. Install cam shaft, gear shift shaft, primary driven gear, clutch and right crankcase cover as described in 3-5 H and 3-5 J.
8. Fit cylinder as described in 3-3 C and cylinder head and cylinder head cover as described in 3-2 C.

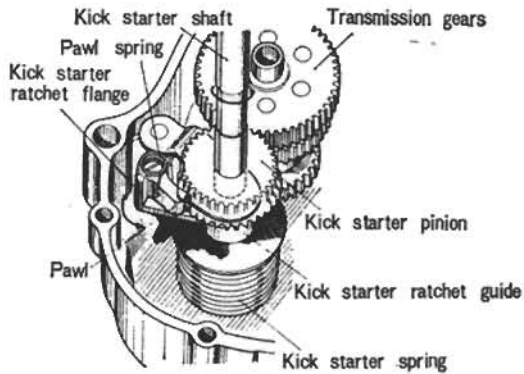


Fig. 3.52

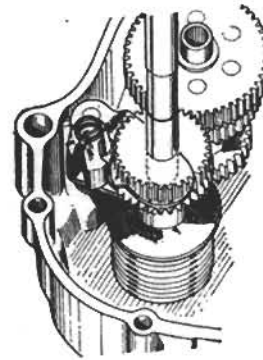


Fig. 3.53

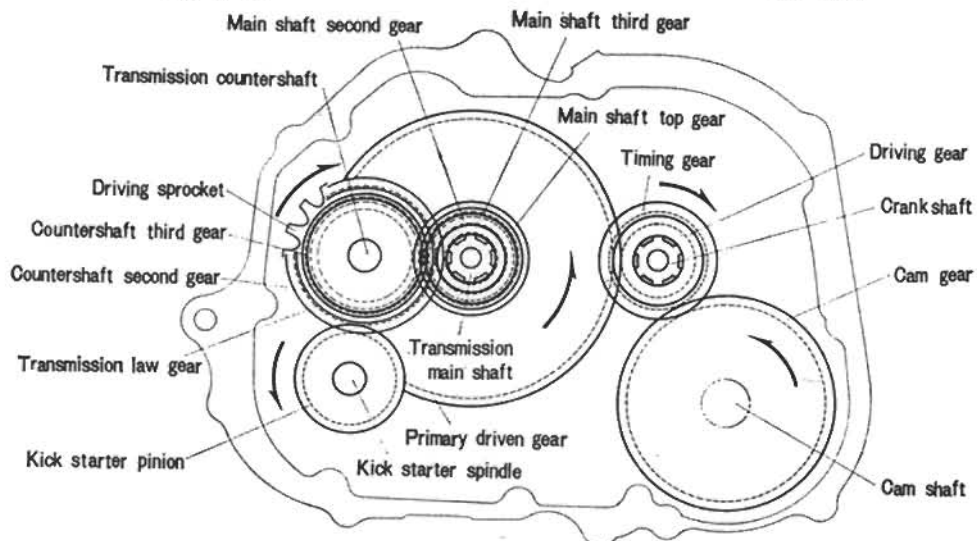


Fig. 3.5 Gear engagement

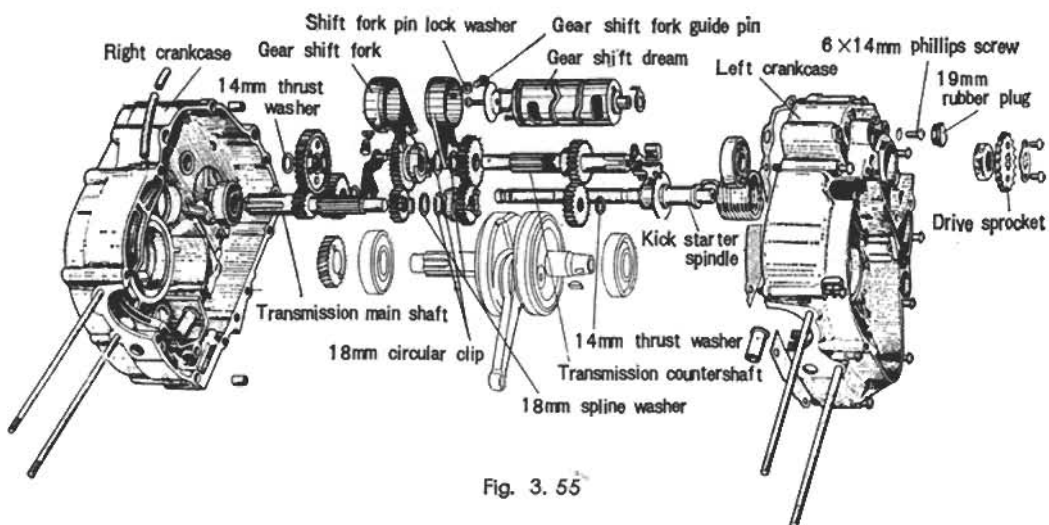


Fig. 3.55

3-8 CRANKCASE

A. Construction

The die cast aluminum alloy crankcase which also contains the transmission gears can be split into right and left halves.

Stud bolts for fitting the cylinder, cylinder head and cylinder head cover are provided on the front part of both right and left crankcases. A breather chamber is provided in the front upper section and with its labyrinth, pressure inside the crankcase is discharged through the right crankcase.

An oil strainer is fitted in the front lower section of the right crankcase.

B. Disassembling

Separate the right crankcase from the left crankcase as described in 3-7 D, leaving the oil strainer and shift return spring installed in the right crankcase and the oil pump and neutral switch contact in the left crankcase.

C. Assembling

1. Place crankshaft assembly in left crankcase.

CAUTION

New gaskets must be used each time the engine is disassembled.

D. Operation of Breather

The inside of the crankcase is subject to pressure fluctuations due to the reciprocating motion of the piston. It also fills with combustion gas leaked around the piston and other gases generated by high temperatures. Contamination and deterioration of lubrication oil is hastened and the oil is liable to leak from joints because of the internal pressure in the crankcase. The breather is provided to discharge these gases and relieve the pressure inside the crankcase.

As shown in Fig. 3-58, the breather is located in the front upper sections of the right and left crankcases and discharges through a labyrinth through the right crankcase.

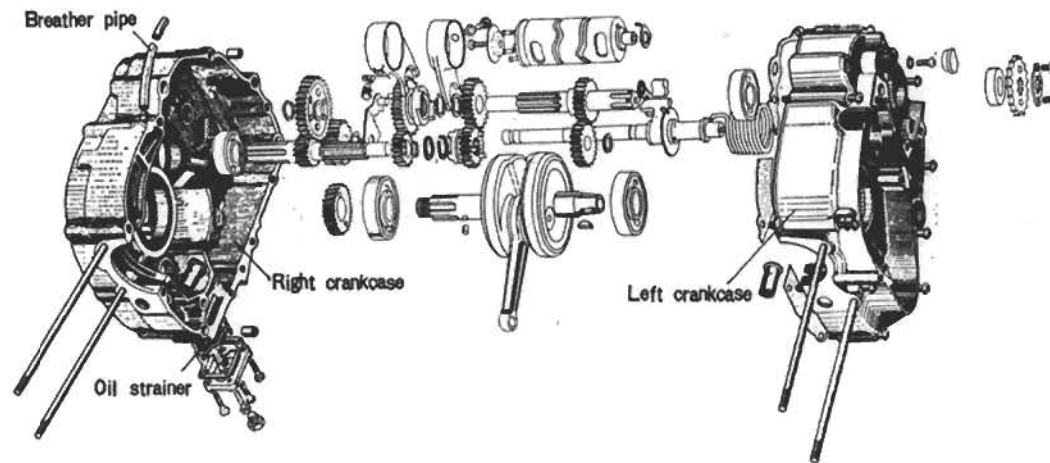


Fig. 3. 56

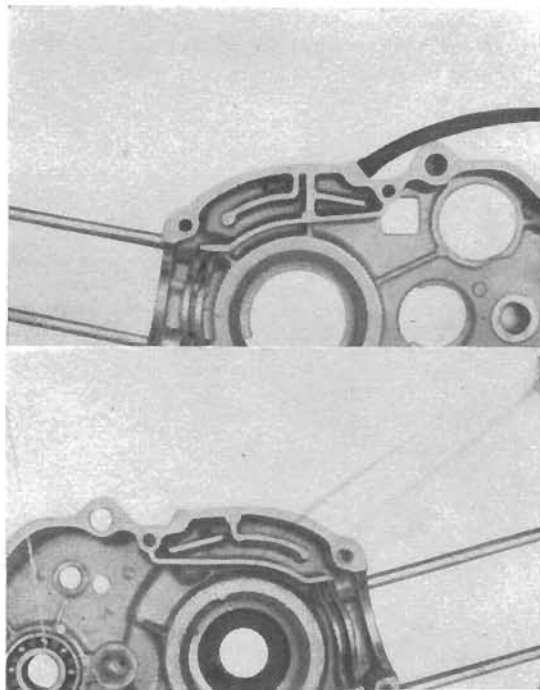


Fig. 3. 57 Breather chamber

3-9 INSPECTIONS AND ADJUSTMENTS

A. Adjusting Tappets

Tappet clearance has a major affect on the timing of the opening and closing of the valves and the running of the engine. A raised tappet can keep a valve from closing completely, releasing pressure in the combustion chamber and preventing the engine from firing. On the other hand, if the tappet clearance is too large, tappet noises become loud. Since tappet clearance is closely related to the output of the engine, affects low speed running and noise, special care must be taken to keep the tappets adjusted correctly.

How to Adjust

1. Remove tappet adjusting hole cap.
2. Remove contact breaker cover.
3. Match the dynamo rotor "T" mark with the mark on the dynamo stator with the piston at top dead center and check tappet clearance.
4. Correct clearance when the engine is cold is 0.05 mm.
5. If the clearance is incorrect, loosen the adjusting nut with tappet adjusting wrench and tappet lock wrench and adjust the clearance with the adjusting screw.

CAUTION

The adjustment may be changed when tightening the adjusting nut, so recheck the tappet clearance carefully after tightenig the nut.

B. Adjusting Ignition Timing

Even if compression and valve timing is correct, the engine cannot perform properly if the ignition timing is not correct. Early or late ignition timing can cause overheating, back-fire and other troubles.

The contact breaker controls electricity flow to the primary coil and by breaking it induces high voltage in the secondary coil. The contact points are the vital part of the contact breaker and the color of their contact surfaces will tell the condition of the engine, as follows :

GrayNormal

YellowGasification of oil must be taking place or oil is contaminating point surfaces

BlueHigh heat due to trouble in condenser, etc.

The contact points wear little by little during operation. If the point gap becomes incorrect or wrong timing is caused it will adversely affect the engine performance. It is necessary to check the points periodically.

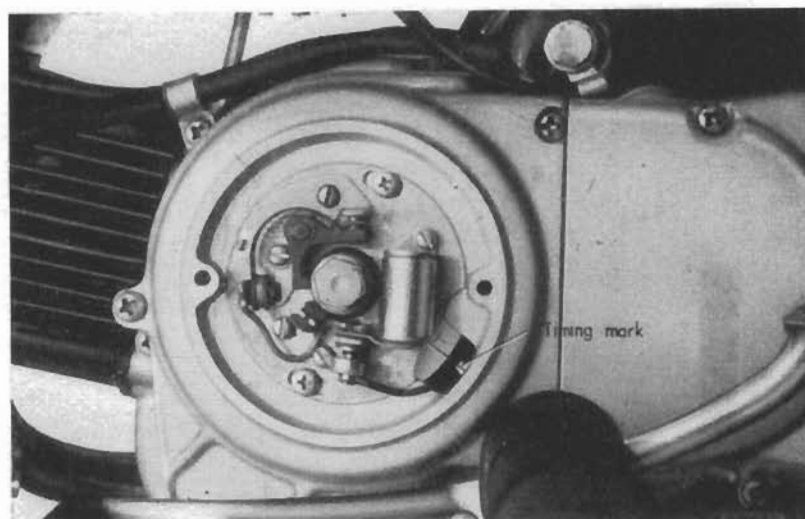


Fig. 3.58



Fig. 3.59

How to Adjust

1. Remove contact breaker cover.
2. Match the dynamo rotor "F" mark with the mark on the dynamo stator.
3. Turn dynamo rotor slightly to open contact points and check point surfaces. If contact surfaces are rough or burned, polish the surfaces with a special file or an oilstone and then clean with gasoline or cleaning solvent. If the surfaces are too rough, the points must be replaced.

CAUTION

Be sure not to leave any oil on the surface of the contact points.

4. Maximum point gap is 0.3-0.4 mm.
5. To adjust, loosen screw "a" and move the stator base.
When gap is too smallContact closing duration becomes too long and induction of high tension current becomes insufficient.
When gap is too largeDuration of ignition becomes too short and sparking function for high speeds is lowered.
Contact points must be replaced when the gap is less than 0.2 mm or more than 0.5 mm.
6. Correct ignition timing is for points to open just after "F" mark passes the dynamo stator mark. This adjustment cannot be made visually, so use a proper tester.
7. Wire the timing tester as shown in Fig. 3-63 and turn on the combination switch and tester switch.
8. Turn the dynamo rotor in a forward direction slowly and adjust the timing so that the tester lamp turns on just at the moment the "F" mark passes the stator mark.
9. To adjust, loosen screw "b" in Fig. 3-61 and move the base.
When ignition timing is too lateMove base to right.
When ignition timing is too earlyMove base to left.
10. Tighten the screw after adjusting.

CAUTION

Adjustment may change slightly when the screw is tightened, so recheck the timing carefully.

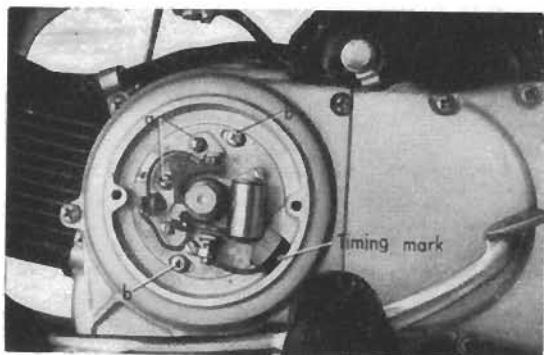


Fig. 3. 60

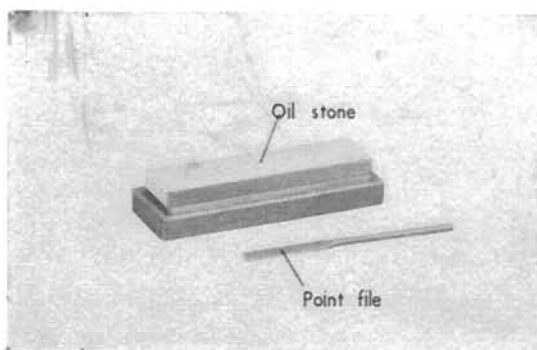


Fig. 3. 61-A Contact point file and oilstone

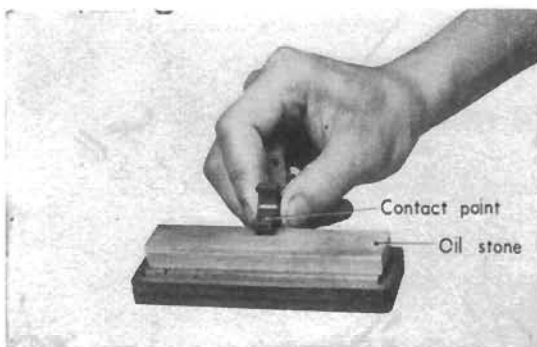


Fig. 3. 61-B Polishing contact point

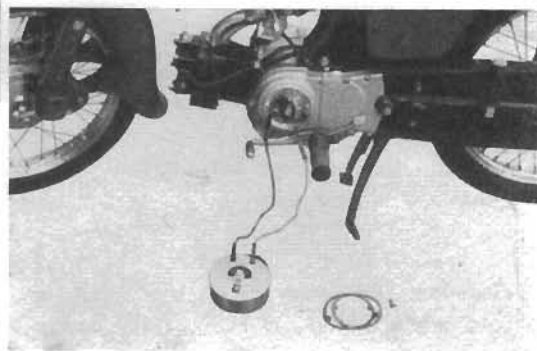


Fig. 3. 62 Measuring ignition timing



Fig. 3. 63

HONDA TRAIL 90 MODEL CT-200 CLUTCH

The clutch is installed between the engine and the transmission. The function of the clutch is to provide a means of connecting and disconnecting the engine and the transmission while the engine is running.

Many types of clutches are in use; cone, centrifugal, single-disc, and multi-disc clutches are used on motorcycles and automobiles. Clutches which work in an oil bath are termed wet type, those which do not, are termed dry type.

For smooth operation when starting or shifting gears, the clutch must engage and disengage properly. Clutch slippage and drag must be checked and properly adjusted for smooth, positive operation of a motorcycle.

The HONDA CT-200 clutch is a wet type, multi-disc, centrifugal, automatic clutch. The clutch is operated automatically by the gear shift linkage when the gears are shifted.

The clutch on the HONDA CT-200 consists of three parts. Refer to the drawing for location of numbered parts.

1. CLUTCH CENTER AND DRIVE GEAR

As the kickstarter is depressed, the force is transmitted through the transmission and DRIVE GEAR (10) is rotated. The CLUTCH CENTER (11) is pulled, by the action of the screw-spline on the CLUTCH CENTER GUIDE (22), in the direction of arrow A. The clutch is engaged and the engine crankshaft is rotated.

Once started; the engine turns at a low RPM, the centrifugal force is small, and the clutch disengages.

2. CENTRIFUGAL PARTS AND CLUTCH FREE SPRINGS

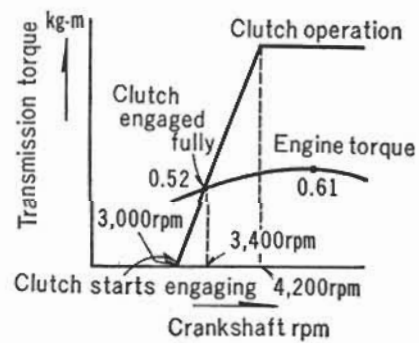
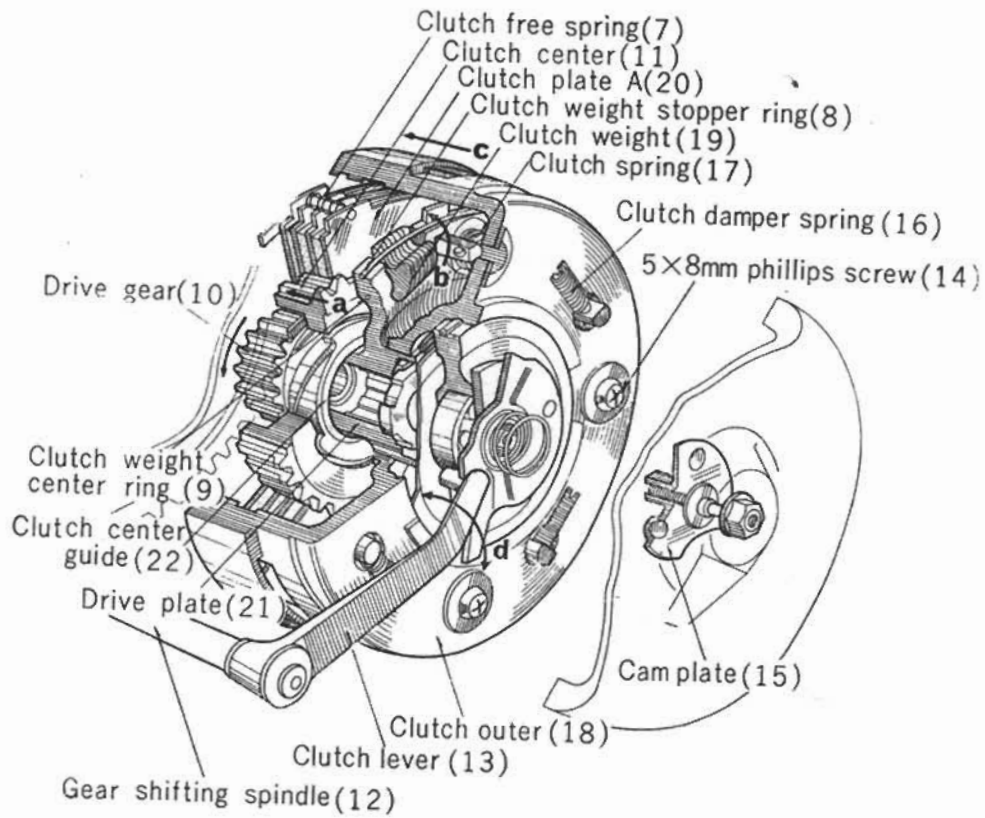
The outstanding feature of the CT-200 clutch is that four weights are used, in place of the rollers used on previous models, to operate the unit.

As the engine RPM is increased, the CLUTCH WEIGHTS (19) move in the direction of arrow B. The weights pivot on the CLUTCH WEIGHT CENTER RING (9). The centrifugal force is exerted on CLUTCH PLATE A (20), which in turn engages the clutch.

When the engine is running, centrifugal force is generated which acts on the weights tending to engage the clutch. A counterforce is needed to resist the force of the weights at low engine speed. The CLUTCH FREE SPRINGS (7) perform this function. While the engine turns a low RPM, the tension of the clutch free springs is equal to or greater than the force of the weights, and the clutch remains disengaged.

At 3,000 RPM, the force exerted by the weights exceeds that of the clutch free springs, and the clutch engages. The pressure of the clutch weights against clutch plate A increases proportionately with the engine speed.

At 4,200 RPM, the travel of the clutch weights is limited by the CLUTCH WEIGHT



STOPPER RING (8). As engine speed is increased above 4,200 RPM, the pressure exerted by the weights remains constant.

At slightly lower than 4,200 RPM the force of the weights equal the tension of the CLUTCH SPRINGS (17) to prevent excess stress from being loaded onto the clutch plates.

Engine torque and the operation of the centrifugal clutch are shown in the chart.

3. CLUTCH OUTER AND DRIVE PLATE

The DRIVE PLATE (21), which is splined to the crankshaft, is a basic part of the clutch mechanism. The CLUTCH OUTER (18) is connected to the drive plate by the four 5 x 8 mm PHILLIPS SCREWS (14) which hold the clutch springs.

When the gear shift pedal is moved, the clutch outer is pushed, through the action of the CLUTCH LEVER (13) and the CAM PLATE (15), in the direction of arrow C, and the clutch is disengaged. The clutch can be disengaged by either upward or downward movement of the clutch lever, as indicated by arrow D. The clutch is automatically disengaged at all times when the gears are shifted, so that gear shifts will be made smoothly.

The CLUTCH DAMPER SPRINGS (16) prevent vibration and noise which result from the clutch outer turning.

The tolerances for the three springs used in the CT-200 clutch are given below. Inspect the springs in the same manner as when measuring valve springs.

	STANDARD (Free Length)	TENSION	LIMIT	REMARKS
CLUTCH SPRING	27 mm	12.4-13.0 kg (27.4-28.6 lbs.)	When length is less than 12.0 mm at required tension	Replace when limit is reached
CLUTCH FREE SPRING	16.5 mm	4.3-4.7 kg (0.9-1.0 lbs.)	When length is less than 11.5 mm at required tension	Replace when limit is reached
DAMPER SPRING	19.8 mm		18.5 mm	Replace when free length reaches limit

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